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CORRECTION

The article "Some Aspects of Overhead Distribution," by Ronald H. Robnett, which appeared in the *N.A.C.A. Bulletin* for October 1, 1946, was cited on page 1481 of the August, 1952 issue of the *N.A.C.A. Bulletin*. Mr. Robnett's given name was incorrectly indicated as "Robert." We are glad to issue this correction.

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A Half-Century of Cost Accounting Progress

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As a recognized profession, industrial accounting is not old, but it is developing rapidly—and becoming more conscious of its scope and responsibilities. This constructive evolution with its implications of approaching maturity is reviewed in this article which covers two eras which have passed, the first to 1920 and the second from 1920 through the close of World War II. It then points up the trends of the modern era, now less than a decade old.

ONE of the chief characteristics of American business is its forward look. Business men are not primarily interested in what happened yesterday or last year but are inherently projective and optimistic in their outlook. They are continually seeking new activities and planning for better and more efficient ways of performing them to-morrow and next year. Occasionally, however, it seems proper to turn our eyes backwards and review the developments of past years. It is especially appropriate, in a study of cost accounting principles and techniques, to understand something of the contributions made by earlier writers and practitioners in the field. Even though much of what was said and done a half-century ago might be considered obsolete by today's practitioners, these earlier colleagues sensed many of the problems faced by the cost accountant of today, even though they may not have developed the techniques which were needed to put their ideas into effective operation.

A Characteristic of a Profession: Responsibility

An article by the present author published in the *N.A.C.A. Bulletin* for May 15, 1945 and entitled "The Growing Responsibility of the Accountant" contained a passage which will also serve for introduction here:

"The work of the accountant has always been one of responsibility. Whether that work was done in the bygone centuries of a Luca Pacioli, or in the days of Bob Cratchit perched on his high stool on Old Scrogge's counting house, or in the present-day comptroller's department of the huge modern corporation with its hundreds of clerks and scores of high-speed accounting machines, it is a work highly essential to the whole scheme of business affairs. To record promptly and accurately the financial happenings of an enterprise, to classify and summarize those happenings in an orderly and scientific way, to use them for the determination and control of costs and the etstablishment of reasonable prices, and to interpret all such data for the use of management has been, and will continue to be, a responsibility of major proportions. In fact, it seems to me that in the years of the future the important work of the internal accountant will increasingly be the orderly recording, classifying and summarizing of business happenings, combined with the scientific control of costs, the planning or budgeting of future operations, and prompt reporting and interpretation for the management of the enterprise. This, if interpreted in a broad way, includes every phase of the accounting function."

In a review of this kind it seems proper, and perhaps desirable, to divide the past half-century into several parts or periods. I shall proceed to do this in making this survey of cost accounting progress. I shall consider the elemental or development period to be that up to 1920, or approximately the close of World War I; then comes the period of rapid development, constituting the next quarter-century, or until the close of World War II in 1945. We will then review the major characteristics of the past half-dozen years, thus bringing our study up to the current year 1952.

"ANCIENT HISTORY"—to 1920

We have no record as to when simple cost accounting began to be used in American industry. However, several significant developments had taken place prior to 1920 in the cost accounting field. In the first place, all available evidence points to the fact that the keeping of cost records in accordance with the principles of double entry bookkeeping had been definitely accepted and well developed. Moreover, it appears that these records were fairly effective in supplying management with historical data regarding *past* production costs. This had been true even during the early years of the twentieth century. However, there seems to have been little attempt to *estimate* or *predetermine* costs during these early years.

The Early Writings

A considerable amount of good cost material had been published during this early period. Cost accounting did not step forth in the late twenties full grown and completely developed but rather represents an evolutionary process which has gained greatly in momentum as the years have passed. Far-sighted

and practical business and professional men had recognized the existence of these problems, and were struggling to find sound and scientific methods of solving them. According to the Research Department of the National Association of Cost Accountants, the earliest known major American writing on Cost Accounting was "The Cost of Manufactures," by Henry Metcalf. The second edition of this work was published in New York in 1890. The Research Department has no record of the first edition of this volume, and I have found none. However, the second edition was a complete book on cost accounting, presenting both the "process" and the "job-order" methods.

Books had appeared even earlier in England, and in 1893 the fourth edition of Garke and Fells "Factory Costs" even went so far as to suggest that cost accounting might be used in the control of costs, thus:

> "Before any order to manufacture is given it is advisable, as tending to produce greater economy in cost of production, that the person best acquainted with its processes and details should estimate the probable cost incurred in wages and materials, in the production of the articles in question. This estimate should be a minimum rather than a maximum one, and the storekeeper, having been furnished with particulars of it should not, without special authority, issue more material for the order than is estimated."[1]

Other early writings include: Henry Roland, "Effective Systems of Finding and Keeping Shop Costs,"[2] in which the author states that "factory cost systems which completely ignored many of the fixed charges were not uncommon at that time"; H. L. Arnold, "Cost Finding Methods for Moderate Sized Shops,"[3] in which he mentions a large boiler manufacturer who "charged production orders with direct costs only, all indirect costs being omitted from factory costs and being sent to the general bookkeeper and there charged to expense accounts monthly;" A. Hamilton Church, "The Proper Distribution of Establishment Charges;"[4] D. C. Eggleston, "A System of Factory Cost Accounting,"[5] in which the author discusses four well-recognized methods of distributing burden, as well as the control of material and labor costs; John Whitmore, "Factory Accounting as Applied to Machine Shop;"[6] and so on.

The series of six articles by John Whitmore included a fairly thorough discussion of burden, its accumulation, and methods of distribution. Much sound

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[1] Garke and Fells: "Factory Accounts," 4th Edition, pp. 51-52. London, Crosby, Lockwood & Son, 1893.

[2] *Engineering Magazine*, November, 1898, p. 207.

[3] *Engineering Magazine*, December, 1902, pp. 385-395.

[4] *Engineering Magazine*, December, 1902, pp. 375 ff.

[5] *Journal of Accountancy*, December, 1906, pp. 115-122.

[6] *Journal of Accountancy*, Volume 2 (1906), pp. 248-258, 345-357, 430-441; Volume 3 (1906-1907), pp. 20-31, 106-122, 211-218.

business philosophy was also included in these articles, as, for example, in speaking of the common interest of the employer and employee the author states: "Waste, if it goes far enough, will be fatal to both, and it is impossible to be sure that any waste injures only the one, or only the other."[7]

And again Mr. Whitmore philosophizes: "The wages that can be paid to any man are obviously limited by two conditions: first, the opportunity for valuable work in the position held, and second, the ability of the man to avail himself of the opportunity. And nothing in the whole matter seems clearer than that the higher the wages that are justified and paid, the greater the profit to both employer and employed."[8]

The Rise of Cost Estimating

Another development was a definite realization that historical, or "post mortem," costs were not sufficient either for management purposes or for setting of prices on an intelligent basis. Pre-determined costs had become rather common either (a) on an "estimated" basis, or (b) an attempt at "scheduled" costs, these being definitely the forerunner of present day standard costs.

As an example of the "estimated" basis of pre-determining costs the standard cost finding system of the United Typothetae of America, prepared in 1909 and revised in 1919, is among the best. This system is not based solely on past experience with average costs and average rates of production, but rather upon such past experience, *plus* current knowledge and present day estimates of future conditions (price of raw materials, wage levels, etc.,) and production demands (future customer orders, etc.). This system of cost finding, for which the man-hour or machine-hour rates were adjusted monthly, served effectively not only as a basis for pricing products, but also as a check upon the efficiency of men and machines ("ems" of type set per man-hour or linotype hour, "impressions" per press-hour, etc.). Even today this system is considered an efficient and scientific plan of cost finding and cost control in an industry made up of thousands of small plants scattered in every town and hamlet of the country.

The "scheduled" costs of these earlier days were the forerunners of our modern standard costs. John Whitmore, as early as 1908, in "Shoe Factory Cost Accounts,[9] approached the modern concept of standard cost finding

[7] *Journal of Accountancy*, January, 1907, p. 211.

[8] Ibid., p. 212.

[9] *Journal of Accountancy*, Volume 6 (May 1908), pp. 12-25, A lecture delivered before the New York University School of Commerce, Accounts, and Finance on February 19, 1908.

methods. On the basis of this article one has the conviction that such methods were in use at an even earlier date. In accounting for leather, for example, Whitmore advocated the valuation of the sorted leather at a "proper" price for each grade, as follows:

Sorted leather (priced at "proper" cost, by grades)	xxx	
Variation (debit or credit)	xxx	
Leather purchases (accounts payable) at actual cost		xxx
Sorting labor (actual cost)		xxx
General expense (actual)		xxx

Whitmore further recognizes that these variances may arise from either or both of (1) prices differing from the "proper" or standard cost, and (2) differences in the quality of the leather.

Whitmore also charged direct labor to work in process at "proper" or standard rates. In the case of overhead expense he states that he had not made an actual application of the same methods but believed definitely that it could be accomplished.[10]

Cost Finding Systems for Industries

The fourth and final pre-1920 characteristic that I shall mention is that there had been a rapid development and adoption by industry of uniform systems of cost finding and accounting. Some of these systems were quite crude, while others represented excellent work, prepared by the best accounting brains of the respective industries. As examples of the latter, one may mention the systems prepared by the American Petroleum Institute, the Electrical Manufacturers Association, the National Retail Drygoods Association (Controllers' Congress), the United Typothetae of America, and the West Coast Lumberman's Association. According to the N.A.C.A. Research Department, 69 such uniform systems had come into existence by 1920.

This movement towards the creation and adoption of uniform systems of cost finding and accounting reveals, in my opinion, several very significant develop-

[10] This article, published in 1908 and describing the above system, according to Dr. W. B. McFarland, formerly Professor of Cost Accounting at McGill University, and now Supervisor of Research at N.A.C.A., was the first of its kind to appear in accounting literature. By 1920 many writings had appeared on the subject, and many uses were being made of such costs: for example, Frederic L. Small's "Shoe Cost Accounting" (Boston, L. & S. Printing Co., 1914), which describes a system very similar to present-day standard cost systems as described by Harold S. Wonson "The Application and Uses of Standard Costs in the Shoe Industry," in the *N.A.C.A. Bulletin* of November 1, 1936, pp. 255-283; Clinton H. Scovell's, "Cost Accounting and Burden Application" (New York, D. Appleton & Co., 1916), pp. 180-183; and G. Charter Harrison's "Cost Accounting to Aid Production" (*Industrial Management*), Volume 56, 1918), pp. 391-98.

ments within industry itself. It represented a very definite awakening, or cost consciousness on the part of industry generally, together with a very specific and constructive attempt on the part of industry leaders to educate all units within their respective industries as to the value and use of modern, scientific methods of cost finding.

It also tended to stabilize these various industries, because, through a definite knowledge of costs, unscientific and unintelligent pricing and price policies were largely eliminated. It thus helped to eliminate the kind of "cut-throat" competition which could result only in demoralization within the industry.

Moreover, this introduction of scientific methods of cost accounting also meant bringing into thousands of industrial units a more efficient organization, better purchasing and production methods, improved controls, and a stepped-up "tempo" generally within individual businesses and all industry. It seems probable that these accomplishments would have been deferred by several decades without the coming of modern and scientific-cost finding methods, and it is a movement for which industry itself must largely have the credit.

ERA OF DEVELOPMENT—1920 TO 1945

The preceding background of developments prior to 1920 now furnish a basis for considering the further growth in cost accounting during the quarter century from 1920 to the close of World War II in 1945. Each of us is largely familiar with what has happened within our own industry and probably in many other industries in our midst. Accordingly, I shall not endeavor to discuss details of developments within that twenty-five year period, but rather to portray the broad sweeps which characterize cost accounting growth during that time. These I have set down as being five in number; they are presented not necessarily in the order of their importance but as a matter of convenience only.

Better Technique; More Extensive Applications

I shall mention first the refinements and improvements in the principles, procedures, and techniques of cost accounting. These include all the improvements and advances in the development and use of predetermined and standard costs; in the computation and distribution of overhead or burden expense; in the handling of materials—purchasing, receiving, storing, issuing, and pricing (including the so-called "fifo" and "lifo" methods); in recording cost variations in the double-entry system of accounts; in the preparation and cost reports and sum-

maries; and so on. Some of these refinements and improvements depend on the increased installation and use of computing and recording machines of all kinds, for these have become recognized as an almost universal need in cost accounting work.

This development of itself might sometime provide the basis of a most interesting presentation, but at the moment it represents merely one of the broad sweeps of the brush on the canvas of cost accounting progress and history. I leave it, therefore, for some later paper to explore and develop.

Second, this quarter century has witnessed the extension and application of costs and cost-finding methods to practically all businesses and to all major functions within the business. In the case of business in general, this is perhaps the result of a combination of circumstances, such as (a) the further expansion of uniform cost-finding methods by industry itself, (b) the requirements of the N.R.A. during the "thirties" that business could not sell below cost, and therefore must know its costs, and (c) the requirements of World War II regulations that costs be accurately determined in connection with war contracts. All of these meant that thousands of concerns learned for the first time something of their costs and the value of cost accounting methods.

Distribution Cost Accounting: Price Fixing

The extension of cost-finding principles and methods to the distribution function is definitely a development of this quarter century. Prior to 1920 articles and books on cost accounting related almost solely to "factory costs" or "production costs." Distribution cost accounting, on the other hand, is primarily a development of the last half of the "twenties" and the first part of the "thirties." At the 1924 N.A.C.A. National Convention two short papers dealt with distribution costs, but at the International Cost Conference of 1930 an entire day's program was given to this highly important subject.[11] Business had come to recognize definitely that profits were not in the till until the product had been both made and sold, and that efficient production can be largely or completely offset by inefficient and expensive distribution. This extension of cost-finding principles and techniques to distribution is a development that is here to stay.

Third, while the use of costs for cost determination and control, management guidance, and pricing within individual businesses had become well established, it also had been definitely determined that the use of costs within an industry to fix prices and restrain trade is entirely outside the pale of the law. The most

[11] See the N.A.C.A. Year Books for 1924 and 1930.

authoritative pronouncement on the subject was the United States Supreme Court decision of June, 1925, in the case of the Maple Flooring Manufacturing Association.[12] In this decision Mr. Justice Stone carefully made the distinction between collusion to fix prices and to bring about restraint of trade, and the collection and dissemination of statistics without any such collusion, in the following words:

> "We decide only that trade associations or combinations of persons or corporations which openly and fairly gather and disseminate information as to the cost of their products, the volume of production, the actual price which the product has brought in past transactions, stocks of merchandise on hand, approximate cost of transportation from the principal points of shipment to the point of consumption, as did these defendants and who, as they did, meet and discuss such information and statistics without however reaching or attempting to reach any agreement or any concerted action with respect to prices or production or restraining competition, do not thereby engage in unlawful restraint of commerce."

The above merely reveals again that there are individuals and business units which will take procedures or methods developed for their benefit and profit and utilize them to the detriment of others. When such persons or businesses reveal a complete lack of social consciousness or moral responsibility, it is both necessary and proper that the strong arm of the law should intervene.

As cost accountants we should rejoice that this point has been settled by the highest court of our land, and that the cost accounting principles and techniques, which we have worked to develop as a basic tool of business and industry, should not have been cast into the discard, but rather should have been freed from improper and malicious use. I personally consider this one of the most important developments of this twenty-five year period of cost accounting progress.

Cost Control; Flexible Budgeting

Fourth, and of particular interest to management, the development and extension of cost accounting for purposes of cost control, and in some cases for cost reduction, was the outstanding item of progress or growth in cost accounting during this quarter century. Generally, this growth in the use of cost

[12] U.S. v. Maple Flooring Manufacturers' Association, U.S. District Court, W. D. Mich., Final Decree, Jan. 4, 1924, appealed March 28, 1924, U.S. Supreme Court Docket No. 342. See also U.S. v. Tile Manufacturers' Credit Association, U.S. District Court, S.D. Ohio, in Equity, No. 201, Final Decree, Nov. 26, 1923; U.S. v. Cement Manufacturers' Association, U.S. District Court, S.D. New York, in Equity, No. 22-25, Final Decree, Dec. 13, 1923, appealed July 24, 1924, U.S. Supreme Court Docket No. 551. These, and many decrees entered since these decisions, definitely establish that the so-called "open-price" work is strictly "taboo."

accounting for control purposes is closely related to the developments that have been made in standard costing. The scientific setting of standards for all the elements of production and distribution costs, and the use of these standards not only in arriving at relative costs but also in determining degrees of efficiency within every part of the business unit, have been among the marvels of modern organization and management.

Finally, I wish to mention the development of the budget, and particularly of the so-called "flexible budget" for use with standard costs, as another major cost accounting development of this 1920-1945 period. This is a somewhat more recent development even than standard costs. In all of the publications listed by N.A.C.A. only one reference appears prior to 1930 (an eight-page paper in the 1928 Year Book)[13] and only six references prior to 1935.

But cost accountants and managements had come to realize that it was not enough to use even a so-called standard overhead, and then disregard in their cost work the fluctuations occurring in actual overhead such as arise from variations in shop activities, abnormal maintenance charges, and so on. This use of the flexible budget is a matter of which cost accountants will hear much during coming years, and through its use in their own companies they will undoubtedly become even more familiar with it.

A Fruitful Period

This means that the growth and development of cost accounting during the twenty-five year period from 1920 to 1945 was a highly satisfactory and truly remarkable one. That period of growth included refinements and improvements in the techniques of cost finding, in the extension of its uses to practically all businesses and to all major functions within business, to the defining of the rights and restrictions under which cost accounting may operate, and it saw standard costs brought to fruition and, to a less degree, its counterpart, the flexible budget. Furthermore, during this period, cost accounting increasingly won the approval of management, which had come to recognize the value of scientific cost accounting methods to serve not only as a medium for the control of cost, but for the reduction of costs also. Management had come to realize that in order to set policies intelligently and then to carry out these plans successfully it needed the factual data which only scientific cost finding methods could yield.

[13] 1938 N.A.C.A. Yearbook, pp. 300-308.

"MODERN TIMES"—SINCE WORLD WAR II

While it is difficult to measure definite progress in a major or professional calling in terms of five or six-year periods, even the period since the close of World War II has seen certain progress, not only in the field of cost accounting but in other phases of accounting as well. I believe we may find some of this not only interesting, but actually pointing the way to greater developments ahead. For example, one of the indications of the growing importance of industrial accounting during the past half-dozen years is the substantial growth that has taken place in accounting associations, and in the demand for accounting literature. Developments of this kind would seem to suggest not only that there are more persons engaged in accounting, but that more of them are definitely interested in advancing their own knowledge about accounting matters.

Progress In Annual Reports

While this paper deals primarily with cost accounting, it is perhaps proper to note that important developments have also taken place in other phases of accounting since the close of World War II. The annual reports of business enterprises have been characterized by simplification in the form of statements, and special significance has been given to the terminology and public relations aspects of such reports. The simplified form of balance sheet, such as that used by the Caterpillar Tractor Company, the United States Steel Corporation, and others, is typical of this. There has been a decided trend toward frank disclosure and an endeavor to reconcile technical and popular terminology. A very evident attempt is being made to have stockholders, employees—yes, and the public—fully understand the meaning and significance of corporate reports.

"Monetary" vs. "Economic" Income

With the rapidly growing inflation of the last half of the "forties" accountants have also devoted considerable attention to the distinction between "monetary income" and "economic or real income," and have endeavored to reconcile, or at least explain, the conflicts inherent in these two concepts.[14] Many accountants and economists believe, for example, that there is a definite misrepresentation in a report of earnings which fails to take into account the changed value of the dollar.[15] And while accounting, under conservative precedents, may not

[14] See the chart on page 22 of the United States Steel Corporation "Annual Report for 1951," and the several pages of comments following (pages 23-27).

[15] This, however, is not a new concept. *The Journal of Accountancy*, for February, 1918, contained an article (pp. 114-120) entitled "Should Accounts Reflect the Changing Value of the Dollar?"

be changed to any marked degree by this influence, nevertheless it has already resulted in increased recognition of the problem by management, and it is a matter which calls not only for careful study on the part of business and operating groups but also sound judgment and fair consideration by legislative and regulatory bodies.

The Controllership Function in Business and Government

In the field of controllership tremendous forward strides have been made during the past six or seven years. Not only has controllership been adopted by many additional corporations, but in the case of larger companies there has also been a definite trend toward decentralizing the controller concept into the lower levels of the organization. This has been accomplished in many companies through the adoption of a divisional form of organization, and here the divisional controller has a responsibility for rendering direct controller services to his divisional manager. Some companies have even extended the divisional organization to the point where individual plants represent divisions, with the plant controller occupying a position of comparable responsibility.

Moreover, the controllershp concept has spread into highly important divisions of the Federal Government. Under the National Security Act of 1947, as amended, Section 401 (a) provides that "There is hereby established in the Department of Defense the Comptroller of the Department of Defense, who shall be one of the Assistant Secretaries of Defense." The statute, Section 401 (b), then proceeds to outline the duties of the office, which include (1) the preparation and execution of the budgets, (2) fiscal, cost, operating, and capital property accounting, (3) progress and statistical reporting, and (4) internal audit. On January 2, 1948, Secretary of the Army Kenneth G. Royall announced the establishment of the Office of Army Comptroller, and since that date there has also been established a Controller of the Navy and a Comptroller of the Air Force.

What happened in the Department of Defense is also taking place in other departments of the Federal Government. The Joint Accounting Program, under the auspices of the Comptroller General, the Secretary of the Treasury, and the Director of the Bureau of the Budget had its beginnings in 1947, and on January 6, 1949 a special staff from the three cooperating agencies was assigned to the work. The program is being carried forward in practically all of the major Federal departments—Coast Guard, Atomic Energy Commission, Bureau of Reclamation, etc.—and is stressing the improvement of accounting in individual agencies through cooperative effort. Methods are being adopted that have stood

the test of experience for government-wide application. These reforms are being further advanced by the Budget and Accounting Act of 1950, which gives additional sanctions to the procedures and goals embodied in the Joint Accounting Program. A foundation of government accounting has thus been built which fosters continuing responsiveness to management needs on the one hand, and integration with budgetary processes and internal controls on the other.

Internal Reporting to All Levels of Management

Another matter which has received greatly increased attention is the preparation and rendering of cost reports for the use of management in the daily conduct of business affairs. The form and content of these reports is most important. More and more effort is being made to see that each member of management receives specific information covering the scope and nature of the activities for which he is responsible. This means that reports must be broken down into certain classes or groupings, depending upon the executive level for which they are prepared. Moreover, within those groupings the cost accountant must take into account the difference in the training, background, experience and general outlook of the individual perusing the material. In general, these executives may be grouped somewhat as follows:

1. **Top executives, consisting of the chairman of the board, the president, vice presidents and major functional heads. These executives want over-all reports on such matters as total production, total costs, costs by product and/or department, total equipment, total payrolls, total sales (units and dollars), total net profit, profit by lines or products, earnings per share of capital stock outstanding, et cetera. Such reports should ordinarily show comparisons with one or more comparable periods.**
2. **Second-line executives, consisting of superintendents, assistant managers, department heads, and the like. These secondary executives need reports that will summarize the activities of their department or field of interest, such as the cost of handling materials, the cost of engineering, of repair work, of machine operation, of the inspection of product, et cetera.**
3. **Minor executives, including chief clerks, foremen, gang bosses, and the like. These individuals should have reports which will show output and cost per man or machine group, reports showing overtime costs, spoilage reports (showing quantities spoiled and costs), reports of lost time, machine idleness and from what cause, reports revealing why workers failed to earn their bonus, and many similar matters. Such reports should relate specifically to that part of the business for which the individual receiving the report is responsible.**

Cost reports should be submitted as soon after the period—day, week, or month—as possible. The value of such a report, generally speaking, is in inverse ratio to the length of time necessary for its preparations! A stale report is of little or no value. A report "hot off the griddle" may be of inestimable value.

Moreover, such reports should be brief and presented in as simple a way as possible. In a discussion of cost reports recently, the executive vice president of a large Pacific Coast corporation stated that the reports coming from the cost department had been somewhat unsatisfactory because (1) the reports were too long in being prepared and so were of litle help in correcting conditions on which they reported, (2) the reports were generally too long, so that the members of management receiving them did not have time, along with their numerous other duties, to peruse them, (3) in some instances the persons who should have received the reports did not get them, and (4) those who did get them frequently could not understand them.

Examples of Effective Reporting

In order to be somewhat more specific, mentioned here are several examples of what I consider to be effective reporting. One large corporation, with mines and manufacturing plants scattered throughout the United States and abroad, has for years followed the practice of preparing monthly balance sheets and income statements for its top executives and having these in their hands within forty-eight hours following the close of the month. Each outlying plant cables or telegraphs in code its trial balance and other essential data before the accountant leaves the plant on the last day of the month. These figures, which are sufficiently accurate for all practical purposes, are consolidated the following day by the head office, and by the morning of the second of the month the typed reports are on the desk of each major executive.

A different type of report is prepared daily for the top executives of a large Pacific Coast department store. Each morning by nine thirty o'clock all major executives have received a report showing for the previous day the cash and charge sales and purchases by departments, cash collections, cash collections on account for the entire store, other miscellaneous receipts and disbursements, and cash balances. Various types of weekly and monthly reports are also prepared; speed in their preparation is constantly stressed.

In the case of a large industrial company, every foreman receives by ten o'clock each morning a report on the activity for which he was responsible the preceding day. The report covers matters which were below normal for the day before. For example, if costs jumped, the foreman can immediately ascertain why. Did materials fail to arrive? Did a machine break down? Was the current shut off? Was there a green operator on the machine? Was the operator ill? Whatever the trouble, immediate steps could be taken to correct the situation as regards the current day's work.

Another large industrial company provides each foreman daily with a "performance report," showing for the previous day all operations costing *more* than they should. Simple terminology, using ordinary layman's language, is emphasized. The foreman is given the actual cost, the "should" cost (meaning the standard cost), and the reasons for the excess cost, that is, whether it was a "fall down" operator, a "high rated" operator, a machine breakdown, or what. He is also given the total actual labor cost in his section for the day, together with the "should have" (or standard) labor cost figure. Some of these failures to meet standard performance may be unavoidable, but others are correctable. Immediate action can be taken.

In somewhat the same way, another company furnishes its foremen with a weekly cost report on spoilage. This report shows for each operator the total units produced during the week, the total number passing inspection, the total numbered spoiled, the percentage of spoilage, the cost per unit spoiled, and the total cost of spoilage for the worker for the week. As would be expected, both the foremen and the workers take pride in keeping their spoilage cost just as low as possible.

Another report shows weekly the idle machine time in each section. This lists the individual machines, the normal operating hours, the hours the machine was idle, the idle-time burden rate for each machine, the total cost of idle time per machine and for the section, and the reason for idleness on each machine. Again, some of this idleness may be unavoidable, but much is correctable. The report at least gives the foreman a definite incentive to apply such corrective methods to his own section or department as may be possible to bring about the elimination of the unsatisfactory condition.

These reports, if presented in simple form and in the shortest possible time, will cause all levels of operating management not only to have respect for the cost accountant and the cost accounting department, but will actually cause them to seek their aid in increasing the efficiency of each department or section, and perhaps to enhance the earnings of the workers and of the supervisor.

Research in Accounting: Other Recent Developments

Finally, there has been a growing recognition on the part of all accountants, both public and private, of the increasing need for scientific, yet practical research. The National Association of Cost Accountants, the Controllers Institute of America, the American Institute of Accountants, the American Accounting Association, and other specialized accounting groups have all contributed during

the past half-dozen years to this program. The Dickinson lectures in accounting at Harvard each year have made further valuable contributions in this respect.

The Accounting Series releases issued by the Chief Accountant of the Securities and Exchange Commission, while in some cases more in the nature of orders or regulations, should also be mentioned as contributing materially to accounting principles and to constructive thinking on many accounting matters. It may be truthfully said that the accounting profession, in the process of growing up, has reached a stage of maturity where it is no longer satisfied to handle accounting matters on a day-to-day basis, but is insistent on having a sound and scientific approach to, and knowledge of, the economic, legal, philosophical and management principles involved. It is for this reason that scientific, scholarly research will become increasingly important in every field of accounting endeavor.

CHALLENGE OF THE FUTURE

As I have given thought to the subject over recent months, and have sought counsel and data from various leaders in the accounting field, I have been impressed anew by the fact that accountants are members of a dynamic and rapidly developing field of business and professional activity—actually, it seems to me, we are going forward by leaps and bounds. This, however, is no reason for settling back in an attitude of self-complacency, for to me it indicates that we are merely on the horizon of still greater accomplishments ahead. During these half-dozen years since the close of World War II accountants have further matured into responsible members of the management group. They have become more and more team men, and through the wise development of data for management uses, they have not only contributed to the efficiency and prosperity of business, but to the solidity and welfare of our whole economic and social system. So, while we may feel genuine satisfaction in the work already accomplished, let us not forget that there is a challenge in the still greater opportunities ahead.

Is There a Doctor of Business in the House?

by NORMAN A. COAN

Assistant Controller, Industrial Accounting, Marathon Corporation, Menasha, Wisconsin

The author believes that two words, engineered profits, reflect the condition all managements are knowingly or unknowingly striving for, that it can best be achieved through proper organization, definitely assigned authority and responsibilities, enforced prior planning (engineering), and essential reports devised on the exception principle following responsibility structure. The whole must be properly integrated by judicious application of staff-designed self-propelling techniques coordinated by the control accountant in the role of resident doctor of business.

THE NATIONAL PERSONAL HEALTH BILL is a staggering sum. It is the total spent for preventive and curative treatment for all kinds of human frailties and ailments. Another national "health" bill, surely amounting to a stupendous sum, would be termed the national business health bill. Absence of preventive "medicine" and inept diagnosis of disorders add to this total, defer many possible cures, and result in unnecessary mortalities.

Dual Responsibility for Chronic Ills

It is believed that this business health bill exists and will continue to exist without commensurate benefit for at least two major, if general, reasons:

1. Management's own fault.
2. The control accounting profession's fault.

As to the first, it can be said that, as the business grows and becomes more complex, many managements do not seem to attain a managerial stature commensurate with the conditions. Continuance of human ills has much the same cause. A person continues to live, eat, work, smoke, drink and play at a pace acquired during his youth and formative years. He does not seek his doctor's advice or heed nature's warnings until ulcers, heart condition, or similar ailments develop. This forces extensive and immediate medical attention. In business, managements do not develop their administrative areas at the same pace as sales and production. Suddenly they realize the existence of a serious pathological condition requiring the attention of a "business doctor." As in the medical field, they usually expect him to repair the cumulative damage of many years of strained operations at once by simply prescribing a few magic pills.

As to the second reason, it can be said that individual top accounting personnel which is part of, and supposedly serving, an administration suffering from progressive inadequacy is either not progressive enough to recognize the symptoms and prescribe for them, or lacks whatever it takes to present and sell its diagnosis and therapy to management. Perhaps as with the medical doctors who cannot induce individuals to shape their health destinies before it is too late, the control accountants as a group have much to develop within themselves in the practice of selling their diagnosis to their managements and inducing them to accept their curative and preventive measures.

Copy for an Advertisement

To place further emphasis on the implied situation with respect to both managements and control accountants separately, and in the working arrangements and concepts of each to the other, the following hypothetical advertisement by a hypothetical company may held set up the background for the meanings intended. Before the reading of the "ad" the question is posed, "How many managements, even today, are disposed to place the following (hypothetical) ad for a man—and how many individuals of the control accounting profession are qualified to take the job, if it were advertised in reality?"

WANTED! A Business Doctor to Help Engineer our Profits

In return for adequate salary, "The Man" will assume the responsibility for developing a state of Engineered Profits for (ANY) Company. He is not expected to know, at once, all the minute facts that THIS management must have, but he must know WHAT facts they need, how to obtain them, and how to orient and evaluate them for proper utility.

In the organization "The Man" will report direct to the (President, Operating Vice President, or a strong Controller having adequate line or staff responsibilities) as his Assistant in Charge of Overall Operating Controls and Profit Planning Functions.

"The Man's" broad responsibilities will be to prescribe and evaluate the techniques to provide:

1. **Adequate sales forecasts oriented with present and proposed facilities for, and the cost of, production.**
2. **Definite results of planned operations in terms of profit to all levels of management.**
3. **The clarification of broad and specific functions throughout the organization, and the evaluation of the performance of each unit in relation to its responsibility.**
4. **The evaluation of present procedures, operations, and personnel performance, in all areas, and the recommendation of improvements where required.**

His objective would be to harmoniously coordinate such activities as:

1. **Line Sales**
2. **Sales Analysis, Market Research, Sales Promotion, Product Research**
3. **Line Manufacturing**
4. **Industrial Engineering and Production Control**
5. **Industrial Relations, Personnel, Wage & Salary Evaluation**
6. **Industrial Accounting, including financial accounting, systems and procedures, internal audit**
7. **Tax, Legal, Credit, and other specialized units.**

"The Man" would recommend the degree of practical utilization of techniques such as:

1. Industry and account records
2. Sales quotas and sales budgets
3. Product standardization and development
4. Engineered standards covering methods and route sheets, material layout and control, plant layout, machine speeds, crew sizes, length of run and preparation, and expense.
5. Production control, including balanced capacities, scheduling, and standard runs.
6. Operating statements (Daily, Weekly, Monthly as required.) for each responsiblity center—on flexible budgets.
7. Performance and project schedules for all routine repetitive assignments, and special assignments.
8. Industrial Accounting (de-emphasis on bookkeeping)
   (a) Charts of Accounts—all areas.
   (b) Evaluation of inventories and cost of sales.
   (c) Product costs, marginal balance, profit per machine hour, etc. for pricing structure.
   (d) Selective selling guides.
   (e) Comparison of profits versus forecasts reflecting responsibility.
   (f) Cost estimates, special quotations, price and cost analysis.
   (g) Profit planning on routine basis.
   (h) Property records and accounting.
   (i) Cash budgets
   (j) Appropriation and expenditure schedules.
9. Profit Planning Special Studies as:
   (a) Trade transfers
   (b) Plant locations
   (c) New or discontinued products
   (d) Effects of change: volume, sales price, costs
10. Management Guides, Systems and Procedures, and operating Instructions. His operations would include free access to all areas to coordinate the results of their efforts toward "Profit Impact," such as
    a. Legal and Corporate
    b. Tax, Insurance, Property Records
    c. Government Regulations
    d. Purchasing, Traffic
    e. Construction, Chemical, Combustion Engineering.

"The Man" in administrative or staff capacity, would more or less be the "Eyes of Management," would recommend action or decisions, and if given line authority, would make corresponding decisions.

As stated, the above imaginary ad is illustrative to emphasize a point. It is deliberately more or less a hodgepodge of elements of management techniques, and you can add more yourself that are not included. The purpose is to point out what, in my opinion, is one of the most important needs of management today. That is the *understanding of the values of the many individual techniques in themselves,* and the *need for coordinating the correct proportion of each in a well integrated whole.* The lack of this understanding and the lack of ability to coordinate them is probably one of the chief contributing causes of "business ills" that eventually result in the need for "business doctors."

Administrative managements, it seems, can more readily understand and accept this concept of specialized skills and their coordination in the physical fields than they can, or will let themselves in their own administrative areas. If their cars break down or their suits require alterations, most top level accountants or line administrators will naturally go to a garageman or a tailor. If the company needs a research chemist or a combustion engineer, they recognize these as specialized technical fields and seem quite satisfied to have the specialist relieve them of their burdens in these areas. However, in their own field of administra-

tion, they either do not recognize that specialty trades exist or are not prone to admit it. This attitude has been diagnosed as being due to reluctance to change, a feeling they adequately know all the trades in their field, or the conviction that admitting the need of a specialist in their own field would be a sign of weakness.

The above may be a part of the reason managements do not run "ads" like the one illustrated. However, the need is there, within the organization, for such "a man" or rather the results such "a man" is intended to produce. Where could you put "the man" in the organization?—if one theoretical man could possibly do all this! How much of the "business doctor" care of management's business ills is normally a part of the service the administrative control accountant is *responsible* for giving to management? How well does he, through the use of his techniques, normally discharge this responsibility?

Generalists vs. Specialists

In this area of understanding and coordination, in my opinion, lies the open field for development and progress of the industrial accountant's value to management, to himself, and to his profession. He must become more the architect of completely developed systems for diagnosis and less the specialist in a few techniques. It must be recognized that no one person (not even "the man" advertised for) can live long enough to become a specialist in all fields—or able to practice all the branches of his art as an expert in each. However, one can learn the technique for gross diagnosis of the various types of ailments so that an opthalmologist is not called in when a psychiatrist is needed.

Too often we think of control techniques as applying to areas other than accounting. The techniques themselves should be woven into a "live system" that has intrinsic self-propelling qualities to perpetuate improvement and coordination of management aids and *keep the accountant on his toes all the time* as well. Skillfully employed, the operating techniques should provide management the opportunity to absorb the understanding and utilize the coordination referred to in previous paragraphs. And we as accountants must grow in our own concepts of this, *our own field*. To really become the "eyes of management" we must develop sharp and far-sighted vision that penetrates our own closets as well as the closets of others.

To understand and coordinate the use of techniques, it is helpful to know of their development. Their growth and acceptance have been relatively slow—it is essentially an evolution, not yet completed. A definite pattern of use has not yet been established. Different stages of the evolution are in actual use today.

The steps might be outlined as: single entry, double entry, overall "actual" costs, departmentalized or cost center "actual" costs, standard costs, flexible budgets, and engineered profits. Standard costs took form about forty years ago. This first major step toward adequate administrative control of diversified activity is not even today universally understood or fully accepted. Flexible budgets took form about twenty years ago. These, in some cases, were superimposed upon, and in some cases replaced, standard costs. Today they are less understood and less generally employed than standard costs. So-called engineered profits is perhaps the latest general overall technique.

During this evoluntionary period of overall, tied in control techniques, many other specialized techniques or trade terms came into being. Many of these were piecemeal techniques that dealt with but a part of the administrative control problem or were incompletely tied in with attempts at overall control. Examples of piecemeal items might be: time and motion study, job evaluation, incentives, spot budgets, quality control, production planning, procedures, various phases of industrial engineering and staff functions, and many others. One example of incompletely tied in techniques of overall control is overall static budgeting at top levels without sufficient perfection of underlying detail. Another is the breakeven or marginal balance technique used on too broad a base as a form of flexible budgeting without sufficient supporting detail. Is the concept of "direct costing of inventories" an overall control concept or a financial accounting maneuver? How do you plan to use it?

Engineered profits techniques can best be described as aiming all guns—little and big—at the overall result: total profits. Perhaps it is not so much a technique of its own as it is the coordination of all techniques, focussing their combined force on profits. It tends naturally and continually to further the understanding, use, and coordination of all techniques in all areas, in the proper balance to themselves and to the overall economics of the whole. It demphasizes side issues and aims everything at total profit.

Perhaps the art or function of the coordination of techniques has not had sufficient emphasis. It is primarily an administrative—a work-through-others quality. It is like the case of the orchestra director who cannot play well himself, yet knows music and the combinations of instruments to produce the desired overall results. It could be an architect or design engineer who in himself is master of no trade, yet knows the place for all the trades in the building, ship, or machine he is designing. In a complex enterprise, no one man or group does all the coordinating. However, if accountants are going to assume and discharge the responsibility of seeing that the coordination of the use of special techniques

is accomplished for their management, then accountants' techniques must include the intrinsic, self-propelling urge that accomplishes the result. *It is not the doctor himself who cures—it is the therapeutics he employs.*

Rx for control

Three illustrative, top level, operating control reports are shown:

1. **Comparison — Profit Vs. Forecast — Exhibit 1**
2. **Comparison — Sales & Sales Profit Vs. Forecast — Exhibit 2**
3. **Manufacturing Responsibility — Operating Variances by Plants — Exhibit 3**

Our generalized and coordinated type of thinking starts as we refer to the Exhibits. They are illustrative of the principles set forth. The design shown might not exactly fit any one existing enterprise—yet the *intent* and *purpose* of all three will apply to many actual situations.

As these are studied, it is apparent that not one of them could logically be prepared for any reasonably complex activity unless preceding their preparation there had first been:

1. **An organization with definite designation of authority and responsibility to separate units.**
2. **Enforced forward planning (forecasts, budgets, engineering) of all activity in all units.**
3. **A rather thorough understanding and coordinated use of many specialized control techniques.**
4. **A strong desire and willingness to operate on the control-by-exception principle.**
5. **Adequate use of industrial engineering, systems and procedures, internal audit, and good industrial accounting techniques.**

As a result of the application of this control plan, both management and accountants should be stimulated to do better planning, set better standards, refine organization, and constantly employ and coordinate the results of the specialized techniques to better "engineer" the profits. Also, the amount of dynamic operating data, in compact form, that is presented to top level management and arranged to commence the "step-down" analysis to smaller units, is evident.

Perhaps a unique feature to be observed is the basic difference between the arrangement of the data on these forms and on the conventional profit and loss statement that some managements and accountants still try to read control data into. These statements do not report a *cost of sales amount at all.* How much actual control utility is there in the cost of the sales figure in total? The cost of sales is the result of many complex movements—it is not a cause of any of them. The product costs were engineered and price-cost-profit relationships were carefully reviewed (See author's article, "Paradoxes in Applying Profit Planning Doctrines," June 1951 *N.A.C.A. Bulletin*) long before the actual state-

COMPARISON – PROFIT & LOSS VS. FORECAST

FICTITIOUS CORPORATION

MONTH OF:				YEAR TO DATE AT:		
VARIANCE	ACTUAL	%(1) VAR.	DESCRIPTION	%(1) VAR.	ACTUAL	VARIANCE
			TOTAL GROSS SALES			
			NET PROFIT			
		(2)	SALES RESPONSIBILITY	(2)		
			Sales Profits			
			Selling Expense			
			Deductions from Sales			
			Volume (Fixed Costs)			
		(2)	MANUFACT'G RESPONSIBILITY	(2)		
			Efficiency (Less Mtl. & Spoil)			
			Material Usage			
			Spoilage			
			Inventory Adjustments			
		(2)	ADMIN. EXPENSE & INCOME	(2)		
			Administrative Expense			
			Non Operating Expense			
			Non Operating Income			
		(2)	FINANCIAL & EXECUTIVE	(2)		
			Purchase Price Variance			
			Revisions of Standards			
			Calendar Variance			
			Retroactive Comp. Adjmts.			
			Repricing Adjustments			
			Volume Variance from Norm.			
			Selected Mgmt. Variances			
		(2)	HEAD OFFICE CHARGES	(2)		

RETURN ON INVESTMENT		
(3) Employed Capital (000's omitted)		$
12 months to date	Gross Sales to Employed Capital	%
	Net Profit to Gross Sales	%
	Net Profit to Employed Capital	%
Yr. to Date Net Profit to Employed Capital		%

CODE:
(1) % Var. = Gross Sales to Forecast & Net Profit to Forecast
(2) % Var. = % of Net Profit Forecast
(3) Employed Capital = (a) The unrecovered cost of fixed assets.
(b) 12 months average inventories.
(c) 12 months average receivables balance.

EXHIBIT 1

ment was produced. The statements show actual and variance from forecast for gross sales, net profit, and many variances for planned amounts. For the type of control desired from these reports, cost of sales is a dead figure.

Digressing for just a moment before commenting on the statements, I have long held that product costs are only a by-product of a good control system. Under such a control system, product costs are obtained as naturally as you get lemon juice by squeezing a lemon. In today's complex business, management's primary objective should not be to start out to install a cost system. They should install a control system, which, if properly designed and operated, will automatically provide the by-product: product costs. In other words, get the lemon first. The juice was there.

The initial exhibit, Comparison-Profit and Loss vs. Forecast—first highlights gross sales, and net profit, and shows any variance from forecast—or overall engineered objective. The sales, where price lists are employed, are *gross price list sales.* (Deductions are covered in detail on Exhibit 2.)

Exhibit 1 then takes management's attention directly into an analysis of *Profit Variance,* shown on the illustration under five major headings. Note particularly: it does not analyze *profit,* it analyzes profit *variance.* You can attempt to analyze *profit* without pre-planning, but you cannot analyze profit *variance* without first having developed a base from which to measure. The technique revealed by each of the exhibits requires enforced pre-planning of all factors affecting profits. This is a powerful intrinsic force urging both management and accountants to coordinate techniques. These reports could not be prepared at all without considerable employment of refined techniques—at all levels. The reports themselves are functioning as "The man." The reports, or rather what must be done in all areas to result in this type of report in the business doctor's therapy constantly applied. As we touch on each of the major divisions of Profit Variance analysis, a few of the techniques required will be set out. Space does not constantly applied. As we touch on each of the major divisions of profit varipermit referring to all of them. The results of other tehniques than those mentioned will be recognized.

Sales Responsibility

This is summarized on Exhibit 1, further detailed on Exhibit 2. The step-down analysis of profit variance starts here. The fact that sales responsibility for profits is set aside and accounted for is, and *can only,* be the result of first having understood and then coordinated at least the following:

1. Organization and assignment of responsibility.
2. Standard costs, systems and procedures, and good industrial accounting.

COMPARISON - SALES AND SALES PROFIT VS. FORECAST
COMPANY SUMMARY
FICTITIOUS CORPORATION

MONTH OF:				YEAR TO DATE AT:		
VARIANCE	ACTUAL	% VAR	DESCRIPTION	% VAR	ACTUAL	VARIANCE
			GROSS SALES			
			NET SALES			
			SALES PROFITS			
			SELLING EXPENSE			
			GROSS SALES			
			Product Line A			
			" " B			
			" " C			
			SALES PROFITS			
			Product Line A			
			" " B			
			" " C			
			" " D			
			" " H			
			ANALYSIS OF PROFIT VARIANCE			
			DUE TO VOLUME AT STD. PROFIT			
			Product Line A			
			" " B			
			" " H			
			DUE TO PROFIT MARGIN			
			Product Line A			
			" " B			
			" " C			
			" " D			
			SELLING EXPENSE BY DEPTS.			
			Advertising			
			Field Selling Expense			
			Market Control			
			Product Development			
			Sales Promotion			
			Sales Service			
			Salesmen's Expense			
			DEDUCTIONS FROM SALES			
			Freight			
			Allowances			
			Cash Discount			

EXHIBIT 2

Particularly the problem of "rubber costs"—either actual or standard—has been met squarely and solved. The accounting group must close out the plants and measure their results against pre-determined costs, and sales profits must be computed from these costs. There can be no changing horses in the middle of the stream (i.e. not following procedure) in regard to costs which might dump a manufacturing variance into the bottomless pit of cost of sales, or net profit, and thus bury a true cause of a profit leak under an overall percent of profit. Likewise, sales cannot evade its responsibility for profits measured from an agreed upon cost and a *gross price list.*

The four subdivisions of sales responsibility are top level categories to focus attention on causative elements. Sales Profits are the Sales responsibility for revenue over the engineered product costs. Selling expense is sales responsibility for difference between price list prices and revenue received. Volume variance under sales is a bit tricky. It is only the volume variance from the short term forecast level of activity, not entire volume variance from a long range normal. Note that this latter is included under financial and executive. A few of the techniques required in these four subdivisions are:

1. **Establishing a standard sales profit at forecast activity.**
2. **Sales expense budget.**
3. **Deduction from sales budgets — sometimes ignored or treated lightly, yet may be from 2% to 15% of sales.**
4. **Mechanics to compute volume variance resulting from deviation from both the long term and the short term volume projection.**

The first "step down" statement is in the sales responsibility area. It generally follows the same lines as Exhibit 1, except that it further details causes of profit variation to stimulate corrective or preventive action. Most of the data on this exhibit also requires the coordination of many specialized techniques. The pre-planning thus required is healthy for a business and keeps some of its arteries from hardening.

The first four lines highlight the top summary figures. The actuals and variances from forecast for gross sales and sales profits by major product lines follow.

The subsequent section analyzes the sales profit variance by lines, due to volume at standard profit, and due to profit margin on actual sales obtained. Quite often, in actual practice, the step of forecasting sales profits by lines, if done at all, is done loosely on an overall percentage basis plus some "kangaroo accounting" attempt to adjust for revised costs and sales prices. Reducing many of the factors mentioned in the author's article, "Paradoxes in Applying Profit Planning Doctrines" in the June, 1951 *N.A.C.A. Bulletin* to a flexible card record

MANUFACTURING RESPONSIBILITY
OPERATING VARIANCE BY PLANTS
FICTITIOUS CORPORATION

MONTH OF:				YEAR TO DATE AT:		
VARIANCE FROM FORECAST	ACTUAL AMOUNT	ACTUAL % OF (1) ENG. COST	TYPE OF VARIANCE BY PLANT	ACTUAL % OF (1) ENG. COST	ACTUAL AMOUNT	VARIANCE FROM FORECAST
			OPERATING EFFICIENCY			
			Plant 1			
			" 2			
			" 3			
			" 4			
			" 5			
		(2)	PREPARATION (length of run)	(2)		
			Plant 1			
			" 2			
			" 3			
			" 4			
			" 5			
		(3)	MATERIAL USAGE	(3)		
			Plant 1			
			" 2			
			" 3			
			" 4			
			" 5			
		(4)	SPOILAGE	(4)		
			Plant 1			
			" 2			
			" 3			
			" 4			
			" 5			
		(5)	INVENTORY ADJUSTMENTS	(5)		
			Plant 1			
			" 2			
			" 3			
			" 4			
			" 5			

(1) Efficiency Variance = % of Engineered Cost except Material and Spoilage
(2) Preparation Variance = % of Engineered Cost Preparation
(3) Material Usage Variance = % of Engineered Cost Material
(4) Spoilage Variance = % of Engineered Cost Spoilage
(5) Inventory Adjustments Variance = % of Total Engineered Cost

EXHIBIT 3

basis for individual products is the technique that underlies good business forecasting of profit by lines. This is employed throughout the year and sales objectives can be set by groups of products in various profit ranges. This latter

practically forces the utilization of good sales analysis and sales quota techniques and here again is evidence of the intrinsic self-propelling force resulting from the use of such statements as these. ("The man" at work through therapy.)

The next section of Exhibit 2 breaks selling expense down by departmentalized functions and the differences between price list gross sales and net sales by their classifications. The first requires the techniques of good sales expense accounting and budgeting, designed not only to facilitate the forecasting of all items, but also to permit this type of expense to be allocated to products and areas. The second requires good general accounting practices with the added control twist of starting with price list prices and analyzing all deductions. Freight is further analyzed for profit variance to mix and "freight over ideal" amounts to reveal losses from nonstandard delivery practices.

Manufacturing Responsibility

The four major categories of manufacturing responsibility to which Exhibit 3 relates cannot be developed effectively without using the combined techniques of at least:

1. Industrial engineering
2. Flexible budgets
3. Production planning and inventory control
4. Systems and Procedures, operating control reports, and good industrial accounting.

Removal of the variances and coordination of separate techniques from many areas are needed. Sometimes, when it is an important factor, the volume variance loss resulting from the inefficient use of machines on actual production is considered as a part of manufacturing efficiency variance. (The author's article "Variances Must be Forged into Familiar Tools" in the June 1950 *Bulletin* briefly covers some of the basic variance concepts.)

Particularly note that a *forecast of variances* is required here, as well as under the financial and executive responsibility. Exhibit 3 requires a forecast of these manufacturing variances by plants. Some may consider this unique; however, we set out to engineer profits and focus everything on profits. Actual profit is realized only after the effect of all variances from all standards employed. Some loosely adjust standards to "soak up" historical variances and assume profits will follow estimates based on the "adjusted standards." In the case illustrated, management continues to measure and evaluate at the operating levels on *good standards*. However, annual profit objectives must include consideration of normally expected variance. Forcing an estimate of all variances at forecast level, tightens the concept of control even if the estimate in a number of details is zero. The sum of such variance forecasts must be evaluated in relation to overall profit

and decisions made to actually eliminate them at operations level or to cost and price over them. Some people actually laugh at forecasting variances. Well, if you *think* you had better take off thirty pounds, I *do not think* you should have your suits altered until you actually have taken off the pounds!

The illustration, at this level, groups the variances for the five hypothetical plants by major type of variance. Behind this, of course, the separate plant operating statements in the step-down sequence show overall results by plant total and departments, and the departmental statements detail each separate area.

Note that the "variance from forecast" variance as well as actual variance is reported. The necessity for and some of the advantages of actually and methodically forecasting variances were pointed out previously. Chiefly, it is because the effect of every operation is evaluated in terms of its effect on profit.

Operating efficiency variance is the difference between actual and flexible budget allowances, for work done at standard methods allowances. Thus, it includes the non-standard methods variance and some others that are detailed on the plant reports. It *does not* include revision of standards, volume, calendar, and others that have been segregated under the financial and executive group on Exhibit 1. The variances on Exhibit 3 are intended to measure the results of the operations only.

Preparation of length of run reflects the difference between standard allowances for actual operations performed and the amount of preparation included in the engineering product costs on a standard quantity or standard conditions run basis. This variance tells management whether more or fewer preparations are being performed for the actual production achieved than were engineered into the product cost structures. The difference between actual performance in completing the actual preparations made, and the standard allowance for such preparations is included in the efficiency or out-put variance above.

Material usage variance is the difference between standard bill of materials allowances and actual usage. Any "substitution" or "revised formula" variance is revealed separately in the plant analysis.

Spoilage variance is the difference between standard and actual spoilage.

Financial and Executive Responsibility

Here an entire book would not adequately cover the subject in its entirety. Here can be revealed the touch of the master strategist through the variance tactics employed. This is where the coordinator extracts the impurities from the numerous operating variances so they can be effective as instruments of responsibility control and he evaluates his separate extractions for management's use.

In the loosely fitted control systems, many of the variances that should be isolated here are left "buried" in operation variances that become a mockery to the term "control." These items in themselves can be the hidden cause of "business ills."

Six examples are shown to indicate the types of variances to be included here. They usually are not directly controllable by any one operating unit and responsibility for them can only be decided upon (if they are recognized and decided upon at all) by a form of policy, accounting, or executive decision. The seventh, "selected management variances" leaves the door open for the analyst to make exquisite use of all the refinements of all the techniques he may know of.

Purchase price variance is quite commonly segregated—as it should be—from the operating figures. On these statements it not only must be segregated, but forecast. This is a refinement that causes reflection at profit forecasting time to show management the profit effects of such factors as:

1. A known deliberate short term deviation from a long established buying practice.
2. An anticipated short term shift in source of supply or alternate materials or service.
3. The effect of a decision to purchase a portion and produce a portion of a material.

The main point is that it is essential to look ahead, require purchasing to estimate trends, and evaluate the effect of any items not taken into account when the standard material costs were changed or of a standard material price calculated as an average of some periods of high and some periods of low prices. Of course, detailed accounts lead up to this summary.

Revisions of standards is one of the most important variances from the management standpoint, yet is often not used, or is used temporarily. As the coordinator you are expected to evaluate the economics of the techniques employed. The revision of standards variance, in its simplest sense, measures the economic effectiveness of the industrial engineering and cost finding effort. The plants are closed out to inventory at the engineered product costs developed at the start of a period, the plants are measured on performance at any new standards approved since the period started, and the difference between the two standards lodges in this revision of standard variance—until the end of a period at which the engineered product cost is adjusted to the new standards. The total of this variance, over a reasonable period, should in the main reflect the improvement or impairment to profits from standard revisions. Usually it is expected that large sums spent for industrial engineering should eventually be recovered through revision of standard amounts—and other savings. Forecasting this amount often results in the formulation of definite planned programs for cost reduction.

Calendar variance is normally expected to "wash out" at year's end to zero. Actual use of the account makes it possible to employ the flexible budget control technique for expenses influenced by months of the year, without the use of an actual general ledger account on a reserve basis. The profit and loss reflects "actual profit" each month, the operating variances are cleared and the amount lodged here is not included in the volume variance amount as it so often is in partial systems. Fuel is a common expense of this type. The case of a heavy bulk material transported by company owned boat in the navigation months and by public rail in the winter months is an example applying in a special situation. This case might also be handled as a ration mix variance under selected variances on the statement.

Retroactive compensation adjustments is representative of any number of situations where "prior-year adjustments" have to be taken into account in the current year, and are not rightfully a part of the current year's charges. Use of this type of handling, requires that pre-planning attention be given them and prevents the common practice of moving them in semi-secrecy on the general books to a surplus account of some kind.

Repricing adjustments are chiefly inventory valuations—not unit adjustments. They may include the re-pricing at new standard costs, the write-downs due to obsolescence (unless charged to some unit direct) and the treatment of valuation reserves of "lifo" adjustments. Pre-planning these amounts smokes some bees out of the tree trunk at times.

Volume variance from normal at the forecast stage is the computed volume variance from long range normal—or any normal different from forecast—on which the current engineered costs are based. This is the volume variance that will affect profits—developed from standard costs at the forecast stage. Forecasting this amount forces considered attention to activity levels as the basis for costs in all areas. It requires good sales budgeting and proper sales production coordination. Developing this figure can reveal impossible or impracticable areas in the planned sales when they are related to capacities. These are much better disclosed before all contracts and commitments are made. A definite planned schedule for operating and a stock control plan can result from this. The development of this variance forecast is a part of engineering profits and the proper accounting to isolate the amount requires the use of many techniques, which combined, generate a constant stimulus to both management and the accountant to be on the alert.

Selected management variances are any that will aid management "engineer"

and control profits by their use. One type in this category is the "ratio mix" variance, examples of which might be:

1. Use of coal, coke breeze, and excess gas in varying ratios in the boiler house.
2. Varying use of a virgin and a reclaimed material.
3. A year's use of power planned partly from the production of an old power plant plus purchased power, and partly from a new plant being constructed and no purchased power.
4. Use of two or more different sized manufactured sheets — to meet producing machine trim to make a product or products.
5. The use of varying amounts of waste and by- or co-products to produce another product.
6. A version of a "non-standard" method variance to allow inventory and price costing at an average rate, such as total output of paint made in three big new mixers and two old small mixers.

These variances usually facilitate the evaluation of the profit effect at the planning stage as well as after the fact. They can be of the accrual type—a standard charge for expense subject to quarterly or annual revision. Examples could be a reserve for salesman's car mileage over a base mileage; a reserve for a major- or semi-major repairs; a reserve for mercury or anode loss or wear in an electrolysis operation; a quantity lot or time based usage of a product or service.

They can be of the "management cushion" type, where a plus factor is included in the costs for price structures to recover a yield or performance variance and operations are to be measured on the tight standards. The plus in this case is recovered only against this variance account.

I will emphasize again, that as an artist can tune a calliope by turning valves, the artisan in the field of variances can tune up these selected management variances to keep management's ears close to the ground so it can sense and evaluate the pitch and tone of what is taking place in the business. These can be the business doctor's cardiograph registering the hidden movements within the business—for profit's sake.

Techniques Unlimited

It is impossible to completely describe an objective attitude for a profession and a complete engineered profit setup in one paper. This paper has tried to show the void in understanding and coordination of the proper use of many specialized techniques that seems to exist, that the fault probably lies at both management's and the accountant's professional doors, and that accountants as a profession and individually should assume the job of filling this void by deploying their skills through the use of a self-propelling overall control technique, that in itself has intrinsic potential to bring about the understanding and coordination in all areas. The generalities and the hypothetical ad in the first

part were intended to set the stage of mood and attitude, and the illustrative top level forms exhibited and commented upon were intended to show that it can be done in one way or another—but it must be done through a system, or therapy.

No Man Can Do It Himself!

The paper must conclude by leaving the readers' thoughts to fill in the gaps of the detailed step-down control reports behind the three top-level ones illustrated. It can only be said here that these top reports can usually be completely prepared by the fourth to the tenth working day after month's end, depending on the scope of activities covered and the amount of divisional or subsidiary summarization required. The underlying detailed operating statements (daily, weekly, or monthly as required) serve both as a control report and source data for the actual journal entries for closing. These entries are unimportant except to close the book. This is *not* done by first making the entries, then posting the ledgers, then getting trial balances, and finally rehandling all the material by analysis to produce the report fifteen to twenty-five days after the month's end. The operating reports reflect the details as they go along and the reports themselves furnish the totals for the ledgers. Thus, the journals can be condensed (detail is on the reports) and the summary reports can be in process of preparation at the same time—or before the ledger posters can arrive at their conventional financial accounting totals. The second form illustrated in the article, "Two Compact Forms for Measurement of Operating Performance," September 1949 *N.A.C.A. Bulletin,* is an example of a basic form that starts the development of the type of control and data assembly usually employed.

If the accountants are to be the "business doctors" for their managements, they must work as administrators, architects, and coordinators, of all the special skills and techniques designed to aid and supplement management. They must work with, by, and through organization structures, with properly dispersed functions, and employ methods and procedure techniques to bring the results of all the separately employed techniques together and aim them all at profit.

As the personal health clinics use hundreds of separate techniques to condition the human structure, the "business doctor" must design his system to constantly reveal the condition of all the parts and processes of the management's business structure. Thus his "self-propelling," "self-cleansing" overall control method becomes the nerve center of the enterprise, connecting and relaying the vibrations from all the separate techniques to be coordinated at the correct responsibility level in the organization.

Profit Analysis for the Magnet Wire Industry

by GEORGE L. FAULKNER

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It is made apparent in this article that the results obtained from product profitability determinations on the bases of marginal dollars per unit, ratio on conversion cost, and marginal dollars per machine hour will not agree but will complement each other and that each is especially pertinent to particular operating situations which may be met. If rounded out by company marginal profit analysis through break-even techniques, management is provided with basic information for selective selling and appraisal of price and cost alternatives.

THE ANALYSIS OF PROFIT is extremely important to the management of any business at any time. However in times of unusual business conditions such as shortages of copper, low business volume, or unusually high or low demand in certain product lines, profit analysis becomes an absolute necessity. Without a realistic analysis of profit, it is possible for a company to be selling itself into bankruptcy and at the same time for management to be suffering the delusion that business is wonderful and everything is fine with the enterprise.

In the magnet wire industry, particularly, the relative profitability of various product lines and of different wire sizes within a product line varies to a great extent. Selective selling, based on an analysis of profit by size and product line, becomes a requirement for a satisfactory profit. The situation may be a complicated one. When business conditions are unsatisfactory, resulting in a low volume of operations, it may be desirable, in addition to returning a satisfactory dollar volume of profit, to also maintain as large a working force as possible in order to retain skilled workers in anticipation of a return to a more normal volume of operations. The possible wisdom of this and like decisions places double stress on product profitability.

The analyses of profit prepared by the company should enable management to determine readily the product lines and wire sizes within product lines which will return to the company the greatest profit margin in cents per pound of copper consumed, the highest percentage of profit to net sales, and the highest percentage of profit to cost of converting the basic raw material copper rod into the finished salable product. In addition to this type of analysis it is also desirable for management to have available information as to the sales volume at which the company will break even and also information of the same character

THE MAGNET WIRE COMPANY PROFIT ANALYSIS BY SIZE AND PRODUCT SELLING PRICES AND COSTS PER POUND

SIZE	NET SELLING PRICE	VARIABLE COST	PROFIT MARGIN	% TO SALES	FIXED COSTS & SAA	TOTAL COST	NET PROFIT	% TO SALES	CONVERSION COSTS	% TO CONVERSION COSTS	PRODUCTION LBS. PER MACHINE HR.	PROFIT MARGIN PER MACHINE HR.
PRODUCT A												
Coarse 13	$ .3102	$ .2631	$ .0471	15.2%	$ .0240	$ .2871	$.0231	7.4%	$ .0402	57.5%	69.6	$ 3.09
16	.3217	.2615	.0602	18.7	.0204	.2819	.0398	12.4	.0338	117.8	97.6	5.88
19	.3181	.2661	.0720	22.3	.0262	.2903	.0478	14.1	.0400	119.5	69.6	4.72
23	.3605	.2834	.0771	21.4	.0341	.3175	.0430	11.9	.0604	71.2	57.6	4.44
Fine 27	.4000	.3051	.0949	23.7	.0491	.3542	.0458	11.5	.0904	50.7	33.6	3.19
31	.4489	.3316	.1173	26.1	.0799	.4115	.0374	8.3	.1405	26.2	18.5	2.17
35	.5512	.3871	.1641	29.8	.1247	.5118	.0394	7.1	.2321	17.0	7.7	1.26
39	.8534	.5201	.3333	39.1	.2938	.7739	.0795	9.3	.4796	16.6	3.6	1.20
PRODUCT B												
Coarse 13	.3361	.2758	.0603	17.9	.0179	.2937	.0424	12.6	.0293	144.7%	110.0	6.63
16	.3533	.2871	.0662	18.7	.0224	.3095	.0438	12.4	.0376	116.5	126.4	8.37
19	.3905	.2984	.0921	23.6	.0265	.3249	.0656	16.8	.0441	148.8	88.0	8.10
23	.4221	.3345	.0876	20.8	.0444	.3789	.0432	10.2	.0781	55.3	46.4	4.06
Fine 27	.5108	.3816	.1292	25.3	.0796	.4612	.0496	9.7	.1352	35.9	20.8	2.69
31	.6342	.4450	.1892	32.0	.1160	.5610	.0732	11.2	.2065	45.1	7.8	1.63
35	.8813	.5829	.2984	33.9	.2394	.8223	.0590	6.7	.4330	13.6	3.8	1.13
39	1.2970	.8105	.4865	37.5	.4953	1.3058	(.0088)	(.7)	.9618	(1.0)	2.4	1.17
PRODUCT C												
Coarse 13	.3525	.2850	.0675	19.4	.0310	.3150	.0375	10.6	.0518	72.4%	283.2	19.40
16	.3961	.2916	.0945	24.5	.0323	.3239	.0622	15.1	.0536	116.0	160.0	15.12
19	.4368	.3179	.1189	28.1	.0514	.3693	.0715	16.4	.0846	84.5	65.6	8.06
Fine 23	.5192	.3862	.1330	25.6	.0314	.4776	.0416	8.0	.1539	27.0	60.0	7.98
27	.6695	.5382	.1313	19.6	.1693	.7060	(.0365)	(5.2)	.2814	(12.1)	25.5	3.35
31	.9657	.7563	.2094	21.7	.3815	1.1378	(.1721)	(17.8)	.6357	(27.1)	11.0	2.30
35	1.4921	1.2921	.2000	13.4	.8703	2.1624	(.6703)	(44.9)	1.4459	(46.4)	4.0	.80
PRODUCT D												
Coarse 13	.4137	.3206	.0931	22.5%	.0352	.3558	.0579	14.0%	.0577	100.3%	153.6	14.30
16	.4676	.3518	.1158	24.8	.0501	.4019	.0657	14.1	.0830	79.2	92.8	10.75
19	.5628	.3977	.1651	29.3	.0743	.4720	.0908	16.1	.1223	74.2	51.2	8.45
Fine 23	.7234	.5111	.2123	29.3	.1463	.6574	.0660	9.1	.2453	26.9	41.5	8.81
27	1.0236	.7893	.2343	22.9	.2871	1.0764	(.0528)	(5.2)	.4766	(11.1)	18.0	4.22
30	1.3474	1.0691	.2763	20.5	.5114	1.5805	(.2331)	(17.5)	.8461	(27.8)	4.0	2.49
PRODUCT E												
Coarse 13	$ .4688	$ .3004	$ .1684	34.6%	$ .0447	$ .3451	$.1177	25.1%	$ .0751	156.7%	176.0	$ 28.26
16	.5032	.3347	.1795	35.5	.0540	.3787	.1245	24.7	.0904	137.7	117.6	20.99
19	.5698	.3633	.2079	36.5	.0795	.4408	.1284	22.6	.1327	96.8	75.6	15.72
Fine 23	.6715	.4466	.2249	33.5	.1374	.5840	.0875	13.0	.2340	37.4	28.8	6.48
27	.8589	.5481	.3106	36.2	.2373	.7854	.0733	8.5	.4060	18.1	14.4	4.47
31	1.3350	.9107	.4243	31.8	.6214	1.5321	(.1971)	(14.8)	1.0457	(18.8)	4.8	2.04
35	2.1616	1.5898	.5718	26.5	1.3008	2.8906	(.7290)	(33.7)	2.1791	(33.5)	2.9	1.66
PRODUCT F												
Coarse 13	.5124	.3193	.1931	37.7	.0422	.3595	.1529	29.8	.0651	234.9%	176.4	34.06
16	.6047	.3956	.2091	42.8	.0568	.4024	.2023	33.5	.0933	216.8	121.2	31.48
19	.6979	.4625	.2954	42.3	.0847	.4872	.2107	30.2	.1521	138.5	78.0	23.04
Fine 23	.8322	.5035	.3287	39.5	.1518	.6553	.1769	21.3	.2576	68.7	30.4	9.99
27	1.0361	.6679	.3682	35.5	.2916	.9595	.0766	7.4	.4918	15.6	15.4	5.67
31	1.5609	1.0834	.4775	30.6	.6502	1.7336	(.1727)	(11.1)	1.0905	(15.8)	5.5	2.63
35	3.0422	1.6674	1.3748	47.2	1.1087	2.7761	.3261	10.7	1.8516	17.6	3.4	4.68

EXHIBIT 1

to enable management to determine the effect on both net profit and the break-even point of increases or decreases in selling prices, or in the cost of copper or other raw materials, labor rates, in overhead, and in investment. This type of information will also be useful in preparing estimates of profit in advance of the actual monthly profit figures and in forecasting profits at various anticipated levels of operation.

In this article, product profitability analyses are dealt with first, followed by consideration of break-even point analysis for the company as a whole. Exhibit 1 presents an analysis of profit by size and for each product shown net selling price, variable costs, profit margin before fixed expense, fixed costs and selling and administrative expense, total costs, conversion costs, production pounds per machine hour, and profit margin per machine hour. Only selected sizes are shown, rather than each size produced. From the information, the management

may make certain observations and reach certain conclusions. It will be pointed out that marginal profit data has especial pertinence as to availability of material, conversion cost profit ratio as to availability of labor, and profit margin per machine hour as to acquisition of equipment.

Product Marginal Profit

Profit margin or marginal income can be defined as the difference between selling price and variable cost. Variable costs are those costs which vary directly with the volume of the product produced. The purpose of the marginal income is to pay the fixed costs of the mill. Whatever is left over after paying these fixed costs is profit. Fixed costs, including selling and administrative expense, are considered as remaining relatively constant, regardless of the mix of products being produced. From the standpoint of profit margin before fixed expense the order of product profitability from Exhibit 1 is:

	PROFIT MARGIN PER POUND AVERAGE SIZE
1. Product F in the fine wire range	$ .3682
2. Product E in the fine wire range	.3106
3. Product F in the coarse wire range	.2591
4. Product D in the fine wire range	.2343
5. Product B in the fine wire range	.2092
6. Product E in the coarse wire range	.1785
7. Product C in the fine wire range	.1313
8. Product A in the fine wire range	.1173
9. Product D in the coarse wire range	.1158
10. Product C in the coarse wire range	.0945
11. Product B in the coarse wire range	.0921
12. Product A in the coarse wire range	.0720

In times of shortage of copper, whether due to government controls or other reasons, for the Magnet Wire Company to maintain the highest possible dollar profit, it must channel its available copper supply into the products which will show the highest dollar profit margin per pound before fixed costs. The products which return this margin will also enable the company to show the highest total dollar profit after fixed costs.

The example below, based on the data in Exhibit 1, shows the effect of selling 1,200,000 pounds of magnet wire per month in the six most profitable products in terms of profit margin per pound, as compared to selling the same quantity in the six least profitable products. In the example, the average wire size of each group has been used for sake of simplicity. Fixed costs and selling and administrative expense of $100,000 per month have been assumed. The figures follow:

SIX MOST PROFITABLE PRODUCTS	POUNDS	PROFIT MARGIN	EXTENSION
Product F Fine	200,000	$ .3682	$ 73,640
Product E Fine	200,000	.3106	62,120
Product F Coarse	200,000	.2591	51,820
Product D Fine	200,000	.2343	46,860
Product B Fine	200,000	.2092	41,840
Product E Coarse	200,000	.1785	35,700
Total Profit Margin	1,200,000		$311,980
Less-Fixed costs and selling and administrative expense			100,000
Net profit			$211,980
Six Least Profitable Products			
Product C Fine	200,000	$ .1313	$ 26,260
Product A Fine	200,000	.1173	23,460
Product D Coarse	200,000	.1158	23,160
Product C Coarse	200,000	.0945	18,900
Product B Coarse	200,000	.0921	18,420
Product A Coarse	200,000	.0720	14,400
Total profit margin	1,200,000		$124,600
Less-Fixed costs and selling and administrative expense			100,000
Net profit			$ 24,600

The profit margin for 200,000 pounds of wire sold varies from $73,640 for Product F Fine to only $14,400 for Product A Coarse. The net profit, if the six most profitable products are sold, is $211,980 as compared to only $24,600 if the six least profitable products are sold. (Available sales volumes are here assumed.) Thus it may readily be seen that, in times of shortage of copper, orders should be solicited and booked first in the products with the highest profit margin per pound. Of course the capacity of the equipment producing these products must be considered.

Product Profitability on Conversion Cost

From the standpoint of cost to convert from raw materials to finished salable product (conversion cost) the order of profitability, again taken from Exhibit 1, is:

	NET PROFIT % TO CONVERSION COST
1. Product F in the coarse wire range	216.8%
2. Product B in the coarse wire range	148.8
3. Product E in the coarse wire range	137.7
4. Product A in the coarse wire range	119.5
5. Product C in the coarse wire range	116.0
6. Product D in the coarse wire range	79.2
7. Product B in the fine wire range	45.1
8. Product A in the fine wire range	26.2
9. Product E in the fine wire range	18.1
10. Product F in the fine wire range	15.6
11. Product D in the fine wire range	(11.1)
12. Product C in the fine wire range	(12.3)

It is immediately apparent that the coarse wire range for all of the various products yields the largest return in relation to conversion cost. Since hourly labor costs are an important part of conversion cost, the management of the Magnet Wire Company can conclude that, in times of labor shortages but ample copper supply, the main sales effort should be concentrated on those products which yield the highest profit percentage of conversion cost.

The following example shows the results of selling a poundage of magnet wire in each product sufficient to have a conversion cost of $25,000. As before the six products most profitable—but, this time, from the conversion cost standpoint—are compared with the six least profitable. The average wire size is used for simplicity. Fixed costs and selling and administrative expense of $100,000 per month have again been assumed. The data show:

SIX MOST PROFITABLE PRODUCTS	CONVERSION COST	CONVERSION COST PER LB.	POUNDS CONVERTED AND SOLD	PROFIT MARGIN PER LB.	EXTENSION
Product F Coarse	$ 25,000	$ .0933	267,953	$ .2491	$ 69,427
Product B Coarse	25,000	.0441	566,893	.0921	52,211
Product E Coarse	25,000	.0904	276,549	.1785	49,364
Product A Coarse	25,000	.0400	625,000	.0720	45,000
Product C Coarse	25,000	.0536	466,418	.0945	44,077
Product D Coarse	25,000	.0830	301,205	.1158	34,880
Total Profit margin	$150,000		2,504,018		$294,959

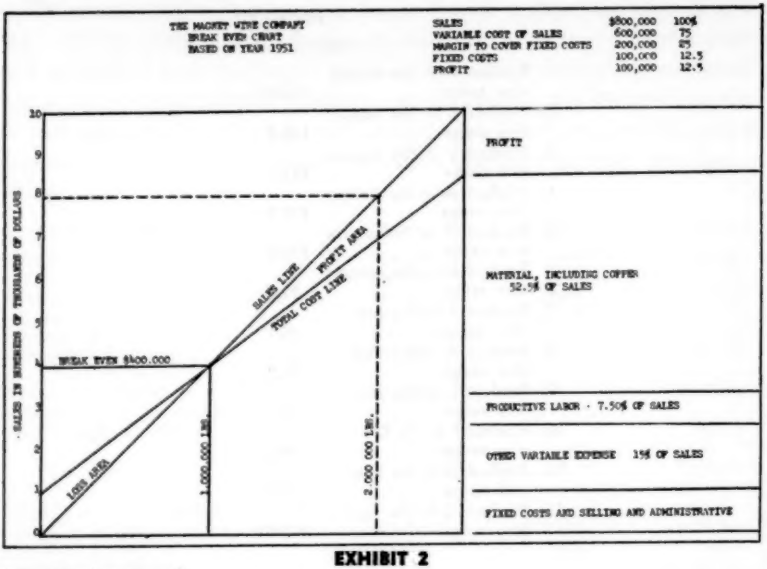

EXHIBIT 2

Less—Fixed costs and selling and administrative expense					100,000
					$194,959
SIX LEAST PROFITABLE PRODUCTS					
Product B Fine	$ 25,000	$ .2065	121,065	$ .2092	$ 25,327
Product A Fine	25,000	.1425	175,439	.1173	20,579
Product E Fine	25,000	.4060	61,576	.3106	19,126
Product F Fine	25,000	.4918	50,834	.3682	18,717
Product D Fine	25,000	.4766	52,455	.2343	12,290
Product C Fine	25,000	.2814	88,842	.1313	11,665
Total Profit margin	$150,000		550,211		$107,704
Less—Fixed costs and selling and administrative expense					100,000
					$ 7,704

On conversion cost of $150,000, the six most profitable products would return a net profit of $194,959 while converting 2,504,018 pounds of copper. The six least profitable products would return a net profit of only $7,704 while converting 550,211 pounds of copper. Thus it is clear that, when funds to be invested in the cost of converting copper to finished magnet wire are restricted either through labor shortages or other reasons, it is most profitable to invest them in the products having the highest net profit percentage to conversion cost.

Product Profit Margin Per Machine Hour

From the standpoint of profit margin per machine hour, the order of profitability of the products shown on Exhibit 1 is:

	PROFIT MARGIN PER MACHINE HR.
1. Product F in the coarse wire range	$31.40
2. Product E in the coarse wire range	20.99
3. Product C in the coarse wire range	15.12
4. Product D in the coarse wire range	10.75
5. Product B in the coarse wire range	8.10
6. Product F in the fine wire range	5.67
7. Product A in the coarse wire range	4.72
8. Product E in the fine wire range	4.47
9. Product D in the fine wire range	4.22
10. Product C in the fine wire range	3.35
11. Product A in the fine wire range	2.17
12. Product B in the fine wire range	1.63

A machine, or several machines, can usually be added to a department without having any effect on the fixed costs of the mill, other than the small amount of depreciation applicable to the machine itself. To show the greatest return on the funds invested in the additional equipment, the additional equipment should be added in the order of profitability as shown above up to the limit of the additional business available in the product it produces. This assumes, of course, that the cost of the various types of productive machines is about equal.

There are, of course, additional interpretations which can be made from the information in Exhibit 1. Those made here, however, are sufficient to illustrate the pattern of analysis and the conclusions which the management of the Magnet Wire Company may make from such an analysis.

Company-Wide Profit Analysis on Break-Even Data

The break-even chart type of profit analysis utilizes selling price, variable cost, profit margin before fixed costs, and fixed costs, and is the same type of information used in profit analysis by size and product. However, the information we use in a break-even chart analysis is the terms of totals for the month's operations for the company instead of figures for each size and product.

MAGNET WIRE COMPANY

TO DETERMINE EFFECT OF 10% INCREASE IN SALES PRICE

$$\frac{\text{Variable Cost } \$600{,}000}{\text{Sales } \$800{,}000 + 10\% \ (\$880{,}000)} = 68.18\% \text{ as new variable ratio}$$

Sales ($800,000 + 10%)	$880,000
Variable Cost of Sales (68.18%)	600,000
Margin to Cover Fixed Costs	280,000
Fixed Costs	100,000
Profit	180,000
Increase in Profit	80,000

To Break Even

$$\frac{\text{Fixed Costs } \$100{,}000}{100 - 68.18\%} = \$314{,}268 \text{ Sales to break even}$$

$314,268 Sales divided by $.44 ($.40 + 10%) Average price per lb. equals 714,245 lbs. to break even.

Check:

Sales	$314,268
Variable cost of sales (68.18%)	214,268
Margin to cover fixed costs	$100,000
Fixed costs	100,000
Profit	—

TO DETERMINE EFFECT OF A 10% INCREASE IN VARIABLE COSTS

$$\frac{\text{Variable costs } \$600{,}000 + 10\%}{\text{Sales } \$800{,}000} = 82.5\% \text{ as new variable ratio}$$

Sales	$800,000
Variable cost of sales (82.5%)	660,000
Margin to cover fixed costs	140,000
Fixed costs	100,000
Profit	40,000
Decrease in profit	60,000

To Break Even

$$\frac{\text{Fixed Costs } \$100{,}000}{100 - 82.5\%} = \$571{,}429 \text{ Sales to break even}$$

$571,429 Sales divided by $.40 average price per lb. equals 1,428,573 lbs. to break even.

Check:

Sales	$571,429
Variable cost of Sales (82.5%)	471,429
Margin to cover fixed costs	$100,000
Fixed costs	100,000
Profit	—

(Continued on next page)

TO DETERMINE EFFECT OF 10% INCREASE IN FIXED COSTS

Variable Ratio unchanged at 75.0%

Sales	$800,000
Variable cost of sales (75.0%)	600,000
Margin to cover fixed costs	200,000
Fixed costs ($100,000 — 10%)	110,000
Profit	90,000
Decrease in Profit	10,000

To Break Even

$$\frac{\text{Fixed Costs } \$110{,}000}{100 - 75.0\%} = \$440{,}000 \text{ Sales to break even.}$$

$440,000 Sales divided by $.40 average price per lb. equals 1,100,000 lbs. to break even.

Check:

Sales	$440,000
Variable cost of sales (75.0%)	330,000
Margin to cover fixed costs	$110,000
Fixed costs	110,000
Profit	—

TO DETERMINE EFFECT OF 10% INCREASE IN SELLING PRICES, 10% INCREASE IN VARIABLE COSTS, AND 10% INCREASE IN FIXED COSTS

$$\frac{\$600{,}000 \text{ Variable Costs} + 10\% \ (\$660{,}000)}{\text{Sales } \$800{,}000 + 10\% \ (\$880{,}000)} = 75.0\% \text{ as new variable ratio}$$

Sales ($800,000 + 10%)	$880,000
Variable cost of sales (75.0%)	660,000
Margin to cover fixed costs	220,000
Fixed costs ($100,000 + 10%)	110,000
Profit	110,000
Increase in profit	10,000

To Break Even

$$\frac{\text{Fixed Costs } \$110{,}000}{100 - 75.0\%} = \$440{,}000 \text{ Sales to break even.}$$

$440,000 Sales divided by $.44 ($.40 + 10%) average price per lb. equals 1,000,000 lbs. to break even.

Check:

Sales	$440,000
Variable cost of sales (75.0%)	330,000
Margin to cover fixed costs	$110,000
Fixed Costs	110,000
Profit	—

EXHIBIT 3

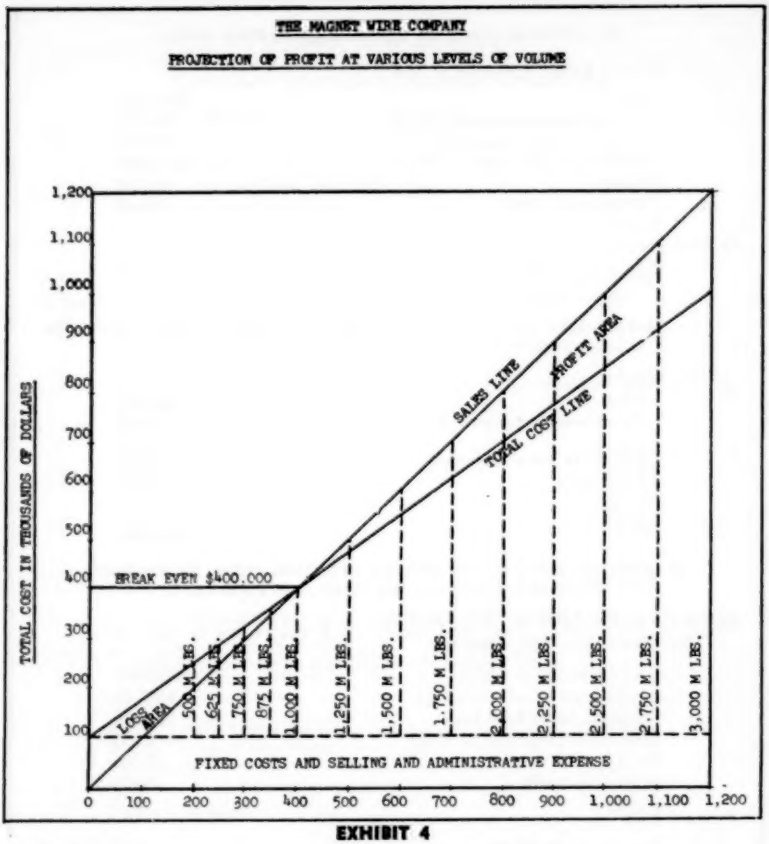

EXHIBIT 4

The break-even point has been defined as the point at which losses cease and profits begin. How to determine it is relatively simple in theory, but in actual practice, may be quite a problem, as the segregation of costs between variable costs may not be clear cut. The accurate determination of fixed costs at all levels of operation is almost a practical impossibility. After the segregation of costs between variable and fixed has been made, the break-even point can be calculated, using the following formula: Total fixed costs divided by per cent margin to cover fixed costs (sales less variable costs as a per cent of sales) gives the break-even point.

The following figures illustrates the calculation of the break-even point for

the Magnet Wire Company. Sales of $800,000, variable costs of $600,000, and fixed costs of $100,000 have been assumed:

BREAK-EVEN POINT BASED ON THE YEAR 1951

$$\frac{\text{Variable Cost } \$600{,}000}{\text{Sales } \$800{,}000} = 75.0\% \text{ Variable Ratio}$$

Sales	$800,000
Variable cost of sales (75.0%)	600,000
Margin to cover fixed costs (25.0%)	200,000
Fixed costs	100,000
Profit	100,000

TO BREAK-EVEN

$$\frac{\text{Fixed costs } \$100{,}000}{100 - 75.0\%} = \$400{,}000 \text{ Sales to break-even}$$

$400,000 Sales divided by $.40 average price per lb. equals 1,000,000 lbs. to break-even.

Check:

Sales	$400,000
Variable cost of sales (75.0%)	300,000
Margin to cover fixed costs	100,000
Fixed costs	100,000
Profit	

The break-even point is thus determined to be $400,000 in sales, equivalent to shipments of 1,000,000 pounds of magnet wire. Exhibit 2 illustrates the familiar break-even chart, using the data given above.

Through the break-even type of analysis, it is also possible to determine the effect of increases or decreases in the selling prices, of changes in the variable costs, of changes in the fixed costs, and of a combination of these factors. The ready determination of the effect of various changes in selling prices or costs is of great value in charting the course of the business. Exhibit 3 illustrates the calculations for the Magnet Wire Company of the effects of changes of these types.

A comparison of the break-even points determined in the preceding examples discloses worthwhile information. A ten per cent increase in selling prices, with other factors unchanged, would cause a twenty-one per cent reduction in the break-even point. A ten per cent increase in variable costs would cause a forty-three per cent increase in the break-even point. A ten per cent increase in fixed costs would also mean a ten per cent increase in the break-even point. A combination of a ten per cent increase in selling prices, a ten per cent increase in variable costs, and a ten per cent increase in fixed costs would increase the dollar break-even point by ten per cent but would not affect the quantity break-even.

Seemingly small changes in prices and costs may have a tremendous effect on the break-even point. These effects are tabulated below:

BREAK-EVEN POINT COMPARISON

	SALES	
	Pounds	Amount
Break-even volume based on year 1951	1,000,000	$400,000
With 10% increase in selling prices, costs unchanged	714,245	314,268
With 10% increase in variable costs, selling prices and fixed costs unchanged	1,428,573	571,429
With 10% increase in fixed costs, selling prices and variable costs unchanged	1,100,000	440,000
With 10% increase in selling prices, 10% increase in variable costs, and 10% increase in fixed costs	1,000,000	440,000

Other information may also be calculated, e.g., net profit at any sales volume, required sales for desired profit, and the effect of an increase in capacity. A convenient chart which may be developed from the break-even chart is a projection of Profit at Various Levels of Volume. This chart for the Magnet Wire Company is illustrated in Exhibit 4. It shows the shipment pounds required to produce certain sales amounts, and from it may be read the total costs and the net profit which could be expected at any sales volume the mill can produce. The accuracy of such forecasts are, of course, dependent upon the pattern of shipments being in agreement with that of the base period used in preparation of the break-even chart. Product mix is an extremely important factor in the mill's profits.

The relationship between marginal income, fixed costs and the break-even point is very important and has been called the profit volume relationship. There are several of these relationships. First, a company should break even at about sixty per cent of normal sales. However, if the monthly sales figure of $800,000 used in the calculation is taken to be normal, then the break-even point of $400,000 is fifty per cent of normal sales. The break-even point is dependent upon marginal income and fixed costs.

Marginal income should run between fifteen and thirty-five per cent, preferably about twenty-five per cent. In Exhibit 1 most products run between fifteen and thirty-five per cent. Product F runs about forty per cent. Knowing what the break-even point should be and what the desirable marginal income ratio is, makes for a good understanding of the requirements for keeping the company on a sound, healthy basis.

Standard Costs Lend Themselves to Profit Analysis Techniques

Profit analysis is, of course, aided by a cost system which will provide accurate costs for each wire size and product, broken down into the elements of cost such

as raw materials, direct labor, other direct costs, and fixed costs. For the magnet wire industry, a standard cost system has been found to be most practical and economical for the continuous process type of operation required in wire drawing and insulating. This type of cost system lends itself well to profit analysis, as it does provide the necessary breakdown of costs into their various elements for each size and product.

The profit analysis techniques touched upon in this paper furnish excellent tools for the guidance of management. The cost accountant can be of great assistance to management by furnishing these tools and aiding in their interpretation.

ORAL REVIEW OF RESULTS

THE ONLY POSITIVE METHOD to assure that reports provided will be utilized is a periodical interview review between a representative of the plant and the plant accountant. We have adopted a method of going over the monthly results with the plant manager in the conference room.

In general, the discussion covers the labor, spoilage and other variable elements of cost by department in detail from identical copies of the reports given to the foremen. Both the factory manager and the accountant make notes on their copies when further information is required from the cost division or the foreman. This procedure results in many benefits:

1. It gives the manager an opportunity to express his problems to an individual who is in a position to interpret their effect from a monetary view.
2. The plant manager develops the ability to understand the reports in a thorough manner, so that he can intelligently discuss them with his foremen.
3. The plant manager uses the notes from his copy of the report as a guide to take action where it is needed most.
4. When the foreman realizes that the plant manager reads and interprets reports on his department and brings to his attention favorable and unfavorable items, he tends to become cost-minded.
5. The cost department gains better understanding of factory operations and problems.
6. The cost department is in a position to change or modify future reports so that the information is presented in an interesting and informative manner.

Considerable expense is incurred in creating and operating a cost system. The only way that this expense can be justified is to use the collected data in an effective way. The solution is regularly scheduled cost discussions between the cost accountant and the plant manager.

ALFRED O. SCHROEDER, *Waterbury*

POINTS O

HOLDING THE LINE AGAINST INDIRECT COSTS

THERE ARE CERTAIN THINGS which the accountant can do to help in the fight against excessive indirect expenditures:

1. He can enlist the aid of operating supervision and the foremen.
2. He can provide a budget system of control.
3. He can provide performance standards for "indirect" employees.

All the control systems in the world have no value unless thoroughly understood by the men who are in the position to spend the dollars and incur the expenses. These men must be willing to cooperate with management in an effort to make the control system successful. Control never takes place within the accounting department. Control of expenditures takes place in the shop, i.e., on the production line where the costs are incurred. Moreover, the supervisor or foreman should be held responsible only for those costs over which he has direct supervision.

The flexible budget is being utilized today more and more as a means of controlling indirect costs. It establishes the standards against which actual expenditures can be measured. To get the most out of a budget system, each major item of indirect expense should be carefully studied and analyzed at the time the budget is prepared and classified according to nature as fixed, variable or semi-variable. There must also be careful study of historical data and ratios, consultation among management, projected goals for expense which tie in with definite levels of operation, and agreement on the company aims, understood by the factory supervision and the financial

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Performance standards can provide management with another accounting tool which can be used in controlling indirect costs. Establishing performance standards makes one do what good supervision really demands, that is, to look behind the day to day expenditures for the indirect expenses and find out just exactly what is going on. It makes one study and analyze the work being performed. As a result, one may discover where the excessive costs are being generated and what may be done to control and even reduce the expenditures.

Supervision of workers performing the so-called indirect functions is more difficult than the supervision of productive workers. There the product or operation sets the task. Indirect employees have the tendency to stretch out their work and make it last when the volume falls off. Performance standards provide a signal of these conditions and subsequent analysis may indicate that there are too many people on the payroll for prospective long-term volume.

BENNETT H. DISBROW, *Paterson*

MILL STUDIES FOR COST CONTROL

A NEW TOOL called mill studies is being used by our cost department to aid management in reducing manufacturing costs by the elimination of unfavorable variances. Mill studies are the complete analyses of manufacturing processes by a group of cost accountants organized for the purpose of studying and analyzing the input and output of materials, machinery, and the human element—labor. An analysis of variance accounts did not always prove effective as the accounts reflected the net results of both favorable and unfavorable variances. An analysis of the unfavorable variances by themselves was required. Here was an area that could be used by management in reducing cost.

It soon became evident, however, that, for our management to use this information more effectively, would require a more detailed breakdown of losses. For example, while analysis could tell our manufacturing supervision the variances by type of material and department, it still left the problem of identification to machine and even operator unanswered. Because of this, it was difficult for management to take corrective action. Through mill studies it was felt that the proper analysis of cost variances could be had.

In performing this function, the mill studies group would undertake to analyze such items as machine downtime and operator inefficiencies through on-the-spot studies. Results were discussed daily with the foreman, and many times, corrective steps could be taken immediately. At the conclusion of a study, a formal report was issued to the plant manager, superintendent, and foremen outlining the objective approaches, and the results.

It must not be construed that this function infringes on that of industrial engineering. It was vested in the cost department because it was felt that, since the cost accountant was thoroughly familiar with plant operations and had an extensive knowledge of cost, valuable rewards would accrue to the manufacturing operations in the form of cost reduction, from applying his knowledge effectively. Important as each original study is, the most important part of the program is the follow-up phase. It is necessary to develop follow-up studies of unimproved factors and of new conditions contributing to unfavorable performance.

JERRY SANTOR, *Newark*

Beneficial Costing for Milk Products

by ROBERT W. CHERRY

Associate Milk Market Administrator, Greater Boston Marketing Area, Production and Marketing Administration, U. S. Department of Agriculture

Neither payrolls—especially as to the specialized skills employed—nor mechanical production facilities used can be made to vary with the wide calendar variation in milk available for processing industries (as distinguished from bottling) which, in the geographical area serving as the basis for the present article, dwindles to one-third of maximum between May and November. The author deals with the problem of allocating the annual processing costs fairly to the products which benefit from them.

NO REMARKABLE PROBLEMS OF COST FINDING are presented by the manufacture of a product which has features of *sales* seasonality, however extreme that seasonality may be. As a general rule, management endeavors to schedule production on a fairly uniform basis throughout the year and to store the finished product until the time arrives for its distribution and sale. Production in rather equal lots throughout the year results in good utilization of the labor force and of plant facilities. The logical concomitant is a uniform cost per unit of product.

The Nature of Milk Supply Seasonality

By contrast, any product which is subject to seasonal extremes in the availability of its raw material presents problems of cost finding which are both pressing and interesting. A notable example of an industry with this kind of seasonality is the manufacture of dairy products in New England. This does not mean that in the seasonal variability of their milk production the cows of New England are sharply different from those which graze upon the meadows in other parts of our country. That all herds give more milk during the warm, lush days of early summer is well known. This fact is the one which is largely responsible for the seasonal changes in the availability of raw material for the manufacture of milk products. A further cause of the extreme seasonality of available raw material in New England milk manufacturing plants is found in the character of New England's milk needs.

New England's milk supply is primarily for fluid milk consumption. When milk production is at its lowest ebb in the late fall, it is just about sufficient, normally to satisfy the urban areas' demands for bottled milk. A relatively small additional quantity of milk is necessary to take care of week-end shopping and

the day-to-day changes in housewives' orders. After this important segment (which represents a fairly uniform volume) has been distributed, the size of the remaining quantities of milk varies seasonally very much more sharply than does the size of the total supply. In the month of November, for instance, the quantity of milk available for manufacturing in New England milk plants is quite small. The quantities available in the months of May and June, by contrast, are greater even than the quantities of milk bottled for consumers. At plants supplying milk to Boston in a typical November, less than fifteen million pounds of skim milk were processed into powder, while nearly forty-five million pounds were processed in the following June.

The Stress of Peak Performance

The products into which this milk is processed are table cream, ice cream, powdered milk and skim milk, condensed milk and skim milk, butter, cheese, and casein. They require the use of expensive machinery operated by technically trained personnel. Both the machinery and the personnel must be adequate to process the peak volume of milk. It is not at all practicable to take on employees and to drop them, completely in tune with the changes in the availability of raw materials. To some small extent the expansion and contraction of the working force occurs, but, in order that technicians may not be lost to a plant when the volume of raw material is at its height, these men must be kept on the payroll and occupied in various ways, such as in painting and repairing, during the months when their specialized skills are not actually needed. Their wages continue at a uniform rate throughout the year, regardless of the nature of the tasks to which the men may be assigned from week to week.

While it is possible to add some employees to a shrunken plant force as milk production commences its upward climb at winter's end, it is, of course, out of the question to hire additional equipment and facilities in harmony with the manufacturing tempo. Storage tanks, batteries of separators, cheese vats, butter churns, condensing pans, powder rolls, and spray power chambers must be large enough to absorb the production on the day of greatest volume. Even were it possible for them to change in size from day to day by the judicious use of some Alice-in-Wonderland potion, their original costs and related expenses, unfortunately, would not change.

To the operator of a small manufacturing plant the basic conditions which obtain, and which have been recited, present no great problem. However, the large-scale operator is engaged in a manufacturing business of no small proportions. He competes with other manufacturers of milk products in a national and

even international market. He needs to make important decisions, and in their making, he regards the careful cost finding of his accountants as no less important than the advice of his economists and the knowledge of his marketing specialists. He needs to know, not only the total costs for his individual manufactured products, but the *unit* costs for each of them. Most important of all, he needs to know his unit costs at various *levels* of productive volumes. At times, he may need to know also his unit costs at hypothetical or projected volume levels of production. All of this information may be decisive data in determining whether to enlarge or reduce current extents or areas of production. Thus, the large manufacturer is led to a rather critical analysis of the nature of costs in an industry of extremely seasonal operations.

Costing by Theory of Beneficiality

What is the cost of a finished product? By one concept, it is the sum total of all the disbursements for labor, material, and overhead which are directly or indirectly incurred from the beginning to the completion of the product's manufacture. Thus, if because of breakage, spoilage, and shrinkage, there is an outlay of $2 for material to complete a product, although with greater care and efficiency $1 worth of material would be sufficient, the cost records will include the larger figure as part of the product costs. In like manner, if an employee is paid $2 an hour to perform an operation which might have been assigned to one who is paid $1 an hour, the labor cost sheets will reflect the higher rate. It is true that standard costs, or budgetary costs, which employ the lower rates for material and labor, may be created for purposes of comparison. These cost figures are used more particularly for goals or for control puposes, while the costs which are made up of the actual outlays for material and labor are regarded as the true or actual costs.

This article has no quarrel with that method of cost finding. Who is to say whether the payment of $2 an hour is excessive, merely because the same operation may be performed at a given time at the rate of $1 an hour? The higher rate may be paid for some added skill, some greater speed, or for some intangible value recognized in the finished product. Our considerations are rather in the direction of allocating expenditures for labor, machinery, and facilities to the particular units of production which obtain the benefit.

The Allocation of Annual Wages

If a skilled butter-maker in the off-season is given the tasks of painting and repairing—work which might be obtained at a much lower rate of pay—, it

seems reasonable that the cost of performing these tasks should not be assessed at the worker's higher actual rate of pay. Certainly, his skill as a butter-maker does not give any special touch to his painting a wall or a piece of machinery. The job he has done is worth no more than the amount which might have been paid to a worker of equal ability in painting or repairing. The wages paid to the butter-maker in excess of the value of the task performed clearly represent amounts paid to him for the skill he will utilize at another time. Rather than pay the employee for eight months of work of a maintenance nature at an hourly rate of $1 and for four months of work in which he is especially skilled at a rate of $4, both the employer and employee prefer payment at the rate of $2 an hour for all twelve months.

This payment preference leads rather naturally to the absorption into monthly cost determination of the actual amount paid. A payment has been made for labor. The labor cost account takes hold of it and sends it on its way through usual channels to create the cost structure! Is this right? We think not. Why should the maintenance account be charged in excess of value received (and in turn relieve itself through overcharging some finished product made during the month) when, obviously, that excess charge represents simply an advance payment against the day when the operator's skill will be properly utilized?

The cost accountant has the responsibility of alloting costs to the product which receives benefit from a particularly outlay. This responsibility may be discharged with ease in a multitude of instances. It may require the exercise of diligence and considerable analysis in other instances. Does the maintenance task performed by the skilled butter-maker receive full benefit commensurate with the wage rate paid to him? Or is it not, rather, clear that $1 of the $2 paid to him represents the benefit given to the immediate task and that the other $1 represents a deferred charge to later butter manufacturing operations? It follows that, if the accountant does not recognize that a part of the regular hourly payment in reality is a stand-by cost of future operations, he causes his costs of those future operations to be understated. An understatement of costs is to be deplored, not alone because of the existence of error, but more importantly for the likelihood of wrong decisions. Encouragement to continue a particular operation may be due to false notions of profit resulting from understated costs.

The Beneficial Theory Applied to Facilities

If it is easy to misapply monthly labor payments to costs for the current month, it is perhaps easier to misapply depreciation charges and other elements of overhead expenditures. It is rather natural for the annual depreciation costs

of buildings, equipment, and machinery to be parceled out in neat packages of one-twelfth of the total charge. Depreciation is presumed to occur with inevitable regularity. As the minutes tick by and the the days' pages are removed from the calendar, inexorably and silently depreciation consumes its share of the assets. A month is gone. A month's depreciation has been incurred. So, the month's operations are charged with a month's share of the diminution of values of the machinery, the equipment, and the building. If a thousand units have been produced during the month, they share the depreciation charge. If ten thousand are produced in another month, the unit share is one-tenth as great.

But, hold! *Does* each month's production reap the same benefits from the depreciating machine? Our answer is, "No."

In the same manner that a man may be paid at uniform hourly or monthly rates, although his skill and peak performance may be utilized only for a relatively short time, so (or possibly more so) a machine may be purchased and held for similar short-term use. In a milk manufacturing plant, one skim milk powder roll may be used irregularly during a part of the year and then at full capacity for several months, and finally a second roll may be operated only for two or three months. These rolls stand ready to handle the peak day's manufacturing demands.

It seems reasonable, therefore, to allot but part of each month's depreciation expenditure to the current month's operations and part of it to the month of peak performance. In an extreme situation, a particular machine may be operated only during one month of each year. In this case, since that month's production would be the sole beneficiary of the depreciation of the machine, the entire year's depreciation charge logically should be absorbed in that month's costs. If the plant's production during that month had not exceeded that of the highest of the other eleven months, this machine would have been unnecessary. In that event, there is no good reason to assess the production of those eleven months with any part of the machine's cost.

If an employee may be maintained in order to process the seasonally high intake of raw materials during a limited period of time and a machine may be acquired for the same purpose, it is true also that a building may be created, of a certain size, to house the working force and the machinery for peak performance. Again, if the peak day's operations were of a smaller size, a building of smaller dimensions would suffice and the costs of depreciation, repairs, taxes, interest on mortgage and investment would be smaller. Part of the actual monthly overhead costs, then, represents stand-by or deferred costs, chargeable against the month of peak operations.

Specifically, the cost accountant should ascertain the size of the labor force (and its make-up), the size of each machine, and the size of the building and equipment, necessary for operating at definite levels of production. In some instances the machine for a certain purpose may have no counterpart of smaller size. Its full depreciation each month must then be charged against the month's operations, regardless of the extent of the operations. On the other hand, if a smaller machine, or one of a battery of machines, would perform the month's work, only the equivalent depreciation (and taxes, repairs, interest, et cetera) should be charged to the costs for that month. The remaining amount should be held in a deferred charge account and applied in keeping with increased volumes in the other months.

Facility (or Other) Utilization Determines Allotments

One interesting result of this type of accounting is the revelation that seasonally large volumes are not necessarily accompanied by lower unit costs. Frequently it will be found that the year-round maintenance of employees, machines, and a larger building, to accommodate the large volume processed for a relatively short time, is too expensive to justify the marketing of the top layer of production. For example, a certain plant may process as follows:

January	70 units	July	140
February	80	August	100
March	105	September	110
April	140	October	85
May	200	November	45
June	250	December	55

One of the machines purchased to manufacture the peak volume is subject to an annual depreciation expense of $276, or $23 a month. Using the monthly uniform depreciation cost of $23 produces the following unit costs:

January	$.329	July	$.164
February	.288	August	.230
March	.219	September	.209
April	.164	October	.271
May	.115	November	.511
June	.092	December	.418

Average $.200

From analysis made by the engineer and the accountant, it appears that several smaller machines might have been adequate to process the quantities available during the months other than June. The machines which could handle the milk each month would have the following amounts of annual depreciation, all markedly below the June figure:

January	$146	July	$179
February	146	August	167
March	167	September	167
April	179	October	146
May	229	November	96
June	276	December	96

The depreciation cost schedule is thus prepared on the basis of increasing facility utilization. The smallest machine has a facility utilization throughout the year. Hence its annual depreciation of $96 is allotted to each month at the rate of $8. (See November and December in the foregoing table.) The next larger machine has an *additional* amount of annual depreciation ($146-$96) of $50 (as for January, February and October). This should be spread over the ten months of use of the additional facility. The third larger machine's additional depreciation of $21 (exemplified by March, August and September) should be allotted to the seven months of its facility utilization; and so on. Finally, the machine which is actually owned has its additional depreciation of $47 (June as compared with May) allotted to the month of June, the only month for which its additional facility is really needed. The completed depreciation schedule is:

(Description of Machine) Annual Depreciation $276.00

	FACILITY DEPRECIATION RATE	ALLOTMENT OF FACILITY DEPRECIATION						TOTAL
January	$146	$8	$5					$13
February	146	8	5					13
March	167	8	5	$3				16
April	179	8	5	3	$3			19
May	229	8	5	3	3	$25		44
June	276	8	5	3	3	25	$47	91
July	179	8	5	3	3			19
August	167	8	5	3				16
September	167	8	5	3				16
October	146	8	5					13
November	96	8						8
December	96	8						8
								$276

When monthly unit costs are determined on the basis of this schedule, it is illuminating to compare them with those obtained by the use of uniform monthly rates of depreciation. It then becomes clear that a high volume of production—when it is of short-term and seasonal—is not necessarily attended by low rates of costs. On the contrary, it may well be true (as indicated in the illustrated instance) that the cost of maintaining an expensive machine for use during a relatively short period of large-volume production may outweigh the benefit derived.

A comparison follows of the unit costs of the depreciation on this machine:

Unit Costs of Depreciation

	BY UNIFORM MONTHLY RATE	BY FACILITY ALLOTMENT METHOD
January	$.329	$.186
February	.288	.163
March	.219	.152
April	.164	.136
May	.115	.220
June	.092	.364
July	.164	.136
August	.230	.160
September	.209	.145
October	.271	.153
November	.511	.178
December	.418	.145

It will be noted that June's unit rate, rather than being the lowest, is more than twice the size of that for November, which showed the highest rate under the other method. Moreover, it will be found that the additional fifty units of production in June, in excess of those produced in May, carry a unit cost of $.94 ($47 ÷ 50). Whether the return from these additional units, or some other consideration, justifies the expenditure is a decision for management.

Similar cost allotments will be made, of course, of stand-by labor, and other elements of overhead.

The Mechanics of Beneficial Allotment are Simple

The accounts for cost allotments on a beneficial basis are simply kept. Stand-by labor is charged each month to an account for unapplied labor. As this labor cost is allotted to its proper month and product, the unapplied labor account may be credited, or a separate account for applied labor may be credited. Similar accounts are used for unapplied depreciation, unapplied overhead, et cetera.

"Should I incorporate beneficial costing in my present accounting system?" Let us look at its value.

Use of this method of cost finding will assist management in determining the optimum size of the processing of individual products and of the total plant operations. It will be helpful in deciding whether to purchase a machine of maximum capacity or a smaller and less expensive one. The method presents a challenge to reappraise one's present devices for ascertaining break-even points. It suggests a reconsideration of present treatment at some plants of idle-machine and idle-labor time.

The method should serve well as a managerial tool in the manufacture of any product which is subject to seasonal extremes in the availability of raw materials.

Multiple Base-Burden Allocation in a Paint Company

by J. RICHARD RAEDER
Assistant Controller, Tremco Manufacturing Co., Cleveland, Ohio

As presented in this article, at least nine overhead allocation factors, plus two special applications of the labor hour basis, are applied, as deemed appropriate, to distribute burden items to departments. Direct labor dollars on a plant-wide basis were previously the sole allocation base. Use is likewise made of direct product charges wherever practicable. As might be expected, product costing also underwent a metamorphosis.

FOR MANY YEARS we employed the plant-wide direct labor cost method for allocating manufacturing overhead to individual products. We had assumed that this method would give us substantially accurate individual manufactured product costs. A new direction was given to our thinking by the construction of our emulsion plant. We realize that, with a relatively much higher investment cost, a much higher power cost, etc., in the emulsion plant, that the plant-wide overhead rate did not present a true and accurate method for distributing manufacturing overhead. Therfore, it was decided that a study should be conducted to determine a proper method or methods for distributing manufacturing overhead to the emulsion plant and to the producing departments other than the emulsion plant and also—one step further—to determine whether or not the direct labor cost method was the best method for distributing our manufacturing overhead to the individual products. The studies resulted in substituted bases for the application of overhead.

THE NEW SYSTEM

Our plant consists of eight producing departments: caulking, mastics, roofing, varnish, paint, emulsion, specialty and packaging. The operations and machines within these departments are similar and, therefore, these departments provide a good basis for accumulating manufacturing overhead on a departmental basis.

Expenses Chargeable Directly to Products

The first step in changing the system was the separation from manufacturing overhead of certain expenses which could be charged directly into the total cost

of the finished products. We were able to devise bases for charging the following expenses directly to products:

1. Receiving department expense.
2. Shipping department expenses.
3. Fuel oil.
4. Gas.

Weight Basis—Since the receiving department had been subjected to rather close control and, for the previous year and one-half had been on an incentive bonus plan, considerable data was available to be used in arriving at an allocation basis. We first classified all of our raw materials into groupings, depending upon the type of materials, the normal quantity purchased and the receiving methods used. Historical records were then used to compute a receiving department cost for each of these classifications. These records were adjusted to current efficiency of the receiving department, because the receiving department efficiency had constantly improved since the installation of the incentive bonus plan. The receiving department expense was then determined for each product by allocating according to product composition the computed receiving department expense for each pound of the different kinds of raw materials.

Labor Time—Although the shipping department was also on an incentive bonus plan, the bonus basis did not provide sufficient data by different sizes of containers to prove adequate for the allocation of this type of expense to products. Therefore, a study was conducted to determine the labor time which was required to handle the different sizes of containers. Shipping department expense was then allocated on the labor time basis to the different sizes of containers. The accuracy of these allocated costs was tested currently on a daily basis to validate their accuracy.

Gallons—Since the use of fuel oil is restricted solely to the emulsion plant, either for the supplying of power for processing or the furnishing of heat for the emulsion building, it was decided to allocate the cost on a gallon basis. A study of historical records revealed that this cost was practically constant in relationship to gallonage produced.

Because almost all of the gas consumed is used by the varnish department, it was decided to allocate this expense also on a gallonage basis. Manufactured products were classified according to time on the fires and a gas cost was computed which was allocated to all of the products in relation to their cook times.

Allocation of Burden to Departments

Area Basis—Floor plans were used to determine the number of square feet which each department utilized for manufacturing operations, storage of raw

materials, and storage of finished materials. It was decided that this area basis would provide the most accurate means for allocating the following expense items:

1. Depreciation of building.
2. Real estate taxes.
3. Fire and Liability insurance and building.

In addition to our main plant, we are leasing a warehouse for some of our manufacturing and storage operations. The square foot basis was used for allocating the rental of this warehouse to the producing departments.

Inasmuch as we must repair and maintain both the main plant and the warehouse, the total of square feet in these buildings was used for the allocation of:

1. Materials used for repair and maintenance of buildings.
2. Wages for repairs and maintenance of buildings.

In our opinion, the area basis provides the most accurate means of allocating the cost of repairs and maintenance of buildings.

Value of Finished Goods Inventory—Certain expense items are directly influenced by the value of the inventory in stock. For our company, because many of the raw materials are used in a variety of the finished products and because the finished goods inventory value is much larger than the raw material inventory value, it was felt that the value of the finished, goods broken down on a departmental basis, would provide an accurate means for allocating:

1. Fire and liability insurance on inventories.
2. Personal property taxes on inventories.

Direct Labor Cost—Certain expense items are directly influenced by the cost of direct labor. The following expense items were allocated on total direct labor costs:

1. Workmen's compensation insurance.
2. Wage payments to absent employees.

It was felt that the expense incurred by the company due to sickness and other similar reasons should be spread over all departments, instead of burdening particular ones.

The departmental direct labor costs were adjusted downward for the payments in excess of $3,000 (or $3600) per year, to arrive at an adjusted direct labor cost basis for allocating the following expense items which accrued only on the first $3,000 (or $3600) of each employee's wages:

1. Unemployment taxes.
2. Social Security taxes.

Kilowatt Hours—The cost of electricity to be allocated to each department was computed after considering the following factors: Potential consumption of the various departments based on rated horsepower and kilowatt hour potential of each department, adjusted by the actual hours during which the department utilized all or part of the consumption potential. The cost of the electricity was then allocated to the department in relationship to the number of kilowatt hours estimated as consumed by its operations.

Labor Time Used in Control Laboratory—Since the control laboratory wages comprise the bulk of the cost of maintaining the laboratory, it was decided that the labor time used in testing and controlling the various materials produced by the different departments would provide the best basis for allocating laboratory cost. Studies were conducted which determined the amount of time normally required to check batches of the various types of material manufactured.

Cost of the Experimental Laboratory—The cost of our experimental laboratory has always been closely accounted for and controlled. For years we have been preparing summaries which show the cost of all experiments which have been worked on. It was possible to summarize the costs of the different experiments under the departments which would benefit from any developments which would be discovered. It was, therefore, possible also to obtain an accurate departmental classificiation of these costs.

A five-year analysis was also made to determine the departmental costs which were annually incurred and the trend of these costs. Based on these two steps we were able to determine a proper allocated cost for the current year on a departmental basis.

Direct Charges to the Departments—Year-end bonuses, group insurance expense and pension trust expense are charged directly to the departments. These expenses attach themselves to individual workmen. Therefore, the charge is placed against the department in which the worker is employed.

Valuation of Machinery and Equipment—Certain expense items are directly influenced by the value of the machinery and equipment. The largest such item for our company was depreciation and, in our opinion, the best basis for allocating depreciation expense is in accordance with the method by which the Bureau of Internal Revenue allows us to provide for depreciation. Therefore, it was decided that the cost value of machinery and equipment would provide a fair and accurate method for allocating the following items of expense:

1. **Depreciation allowance for machinery and equipment.**
2. **Personal property taxes on machinery and equipment.**
3. **Fire and liability insurance on machinery and equipment.**

It was felt that the preferable way of determining the cost of repairs and maintenance of machinery and equipment would be the accumulation of these costs on individual work orders for each repair or maintenance project. Our accounting procedure is being revised to provide us with these costs. However, we feel that a fairly accurate estimate of the cost of repairing and maintaining machinery and equipment can be estimated by considering two factors: the cost value of the machinery and equipment and the age of the machinery and equipment. On these two factors a weighted cost basis was determined for allocating the cost of wages and material used for repairing and maintaining machinery and equipment.

Direct Labor Hours—The allocation factors which have already been described enable us to distribute at least seventy per cent of our manufacturing expenses to the departments on generally accepted cost accounting bases. The expense items still remaining are general burden. These are allocated to the producing departments on a direct labor hour basis

Detailed studies were made of all of the items which make up the general burden. These studies revealed that most of the expenses occurred in a rather direct relationship to the direct labor hours used by the different producing departments, with the exception of the packaging department. Therefore, the packaging department was subjected to additional studies in order to obtain an adjusted direct labor hour which would be equivalent to the direct labor hour of the other producing departments.

It was felt that the costs of supervision, factory indirect labor and factory clerical expense would be measured quite accurately by the direct labor hour basis. These costs account for about three-quarters of the general burden expense. It was also felt that the remaining items of general burden varied to a large degree with direct labor hours. The items which comprise general burden are as follows:

1. Supervision.
2. Indirect wages-manufacturing.
3. Factory clerical expense.
4. Factory supplies.
5. Miscellaneous manufacturing expense.
6. Water.
7. Wages—cost of transferring product to different size containers.

Product Costing—Labor or Machine Hours?

Product costing is commonly accomplished by the use of one of three methods:

1. Unit of product.
2. Direct labor time.
3. Machine time.

Whenever all products produced in a department are either homogeneous or very similar and require the same amount of direct labor and machine processing,

COMPARISON OF DEPARTMENTAL BURDEN—1948 AND 1949

DEPARTMENT	OLD METHOD*		NEW METHOD	
	1948	1949	1948	1949
A	.347	.363	.410	.406
B	.216	.210	.168	.232
C	.189	.169	.161	.153
D	.129	.121	.123	.124
E	.126	.101	.231	.121
F	.076	.079	.064	.070
G	.038	.033	.037	.039
H	.233	.288	.178	.207

*5½% increase over-all and by department

DEPARTMENTAL STATISTICAL DATA

Increase (Decrease) 1949 as compared with 1948

DEPARTMENT	VOLUME	EFFICIENCY	DIRECT LABOR RATE
A	1.5%	0.5%	(5.0%)
B	(55.0)	15.0	5.0
C	5.0	15.0	(2.0)
D	2.0	7.0	(5.0)
E	158.0	47.0	10.0
F		Not Computed	
G	(16.0)	5.0	3.0
H		Not Computed	

EXHIBIT 1

the unit of product method may be used. These conditions do not exist in our company.

Direct labor time should be used when direct labor is the dominant factor and machine time should be used when the machines are the dominant factor. Although all of our products are manufactured by machines, there was considerable doubt expressed as to whether the direct labor time or the machine time was the dominant factor for our company. Therefore, considerable thought and consideration were given to this matter by all the interested parties and it was finally concluded that the direct labor time would provide the best method for allocating departmental overhead to our products. However, it was also determined that the relationship between direct labor time and machine time is almost always constant and, therefore, the results of either method of allocating departmental overhead would be almost identical.

Our accounting records provide us with a historical record of units produced and direct labor time used by the different departments. Therefore, we were able to determine the proper amount of overhead which should be allocated to each gallon of the various products produced. Because the production in some

of our departments is subjected to rather sharp variances from year to year, normal capacity is taken into consideration when selling prices are set, in determining the proper amount of overhead to be allocated to each gallon produced.

COMPARISON OF THE OLD METHOD AND THE NEW

A two-year summarization for the years 1948 and 1949 was prepared in order to compare the unit costs obtained by using the two overhead distribution methods.

Departmental Comparisons

The tables in Exhibit 1 show the results of this two-year summarization in terms of overhead absorbed per gallon of production.

In Department A, the old method of burden distribution reflects the stability of the department. The increase between years is due to the five and one-half per cent increase in overall plant overhead. The new method shows that the overhead did not increase in this department.

For Department B, the old method of distribution indicates that the increase in efficiency more than offsets the overall increase in plant overhead. It does not reflect the volume decrease. The substantial increase in the rate under the new method is accounted for principally by this substantial decrease in production.

With respect to Department C the volume and efficiency factors would indicate that the trend in overhead rates should be downward. Both methods of overhead allocation show this decrease and the question is only which method does so more accurately.

Coming to Department D, again the first two factors—volume and efficiency—would indicate that the trend in overhead should be downward. The old method reflects this trend and the trend is accelerated by the direct labor rate decrease. The new method indicates that increase in overhead for this department more than offset the gains made in volume and efficiency.

For Department E the old method of charging burden indicates that the increase in efficiency more than offsets the direct labor cost increase and the increase in overall plant overhead. The new method conclusively indicates the substantial decrease in overhead is due to substantial gains made in both volume and efficiency.

Data for both methods give comparable results for comparative purposes. Again the question is which of the two determinations is the more accurate.

As applied to Department G the old method indicates that the increase in

efficiency would more than offset the overall increase in plant overhead. The new method indicates that the volume decrease would be influential in causing the increase in the departmental overhead rate.

The last unit, Department H is the packaging department which was assigned an arbitrary overhead rate under the old method. The new method indicates that this overhead rate was too high, a fact which had already been confirmed by competitive selling prices.

CONCLUSION

It is believed that the new cost system provides more accurate costs than the old cost system. The old system, based on direct labor cost, contained several unsound assumptions in its theory. In the first place, it assumed that most of the expense would vary in direct proportion to the direct labor cost. This was not true for, during the development of the different allocation factors for the new system, it was determined that many of the expense items accrued on bases very different from the direct labor cost basis which the old system used. In the second place, the direct labor cost basis did not reflect the volume variance within a department accurately. This was due to the fact that the direct labor cost basis was sound as far as variable overhead items were concerned but did not provide an accurate basis for accounting for fixed or semi-variable overhead items. Finally, the direct labor cost method assumed that the overhead within a department would increase as the average direct labor hourly rate increased. Whenever the average direct labor hourly rate increased due to merit increases, this was naturally accompanied by an increase in efficiency, which had the effect of reducing many of the overhead items.

The principle advantages of the new cost system is that it allocates the overhead on the best attainable bases, reflecting causes for the increase or decrease in overhead. Therefore, volume variances are properly accounted for. It is management's belief that the new system will provide a valuable tool to assist in bidding for large-scale, low-priced business and will enable utilization of present facilities to better advantage. If this large-scale business is obtained, the fixed overhead will be spread over a larger number of units and, therefore, the unit costs will be decreased. Furthermore, management believes that it will now be possible to obtain a much more accurate determination of profits by product lines and that the sales program can be reshaped to emphasize products which are the best money-makers.

Action Reports for a Magazine Wholesaler

by WILLARD K. TARRANT

Partner, J. K. Lasser & Co., New York, N. Y.

Five profitability reports — together with significant supplementary tables—are given in the present article, each designed to disclose one side of the operating picture which confronts the wholesaler of periodicals, uncomfortably wedged in, as he is, between distributor on one hand and retailer on the other.

IN 1951 TWO BILLION MAGAZINES and pocket-size books were sold over the 100,000 or more newscounters of the United States and Canada. The complex job of putting the right number of copies in these outlets at exactly the right time is done in two ways:

1. Some of the magazines are distributed to the newsstand by the American News Company which, working directly with the publisher, funnels the copies to retail outlets through its regional distribution points. In addition, through its subsidiary, the Union News Company, it maintains some newsstands of its own.
2. Most magazine publishers sell their copies through independent distribution.

This business—some $300,000,000 worth a year at retail—is handled by national distributing companies, working with some 850 independent wholesalers in key cities throughout the U. S. and Canada. A national company distributes all of newsstand copies of certain magazines or small books. A wholesaler usually has territorial franchises with many distributors.

Distributor—Wholesaler—Retailer Relationship

The relationship of the national distributor to the magazine wholesaler and that of the wholesaler to the retailer are unlike anything else in American industry. The wholesaler does not order the magazines he receives. The distributor determines the quantities he believes the wholesaler should receive, basing his allotment on past sales of the publication, seasonal trends, local economic conditions, articles of regional interest in the particular publication and a number of other reasons. The wholesaler, in turn, decides how to break down his allotment among his customers. The governing factor here is each retailer's recent sales records with the magazine in question.

Because of this arrangement, all parties in the chain have the right to return unsold copies for credit.

Some Questions the Wholesaler Needs Answered

As in every business, costs of magazine wholesaling have risen sharply in the past two years, but publishers have held the line on prices of the magazines,

and as a result, the wholesaler's commission per copy has remained the same. Wholesalers who, in previous years, were able to survive with the sketchiest sort of accounting, are intensely interested today in the subject of costs. Although they do not need costs for pricing, they must have an adequate knowledge of their cost structures for several reasons. The wholesaler has to know:

1. Which newsdealers are loss customers.
2. How profits of the different sales routes compare.
3. How much he is making or losing on the lines of certain magazine distributors.
4. How his costs compare with industry averages which are periodically issued by his trade association.

Just as his methods are different from other businesses, the wholesaler's distribution cost ascertainment procedure must be unique. It must give him the answers to his questions, but it should not require masses of clerical work.

Functional Areas Represented by Wage Costs

The simple cost determination method outlined here emphasizes wages and related cost almost completely. Cost centers are not used for labor cost accumulation. Instead the "functional area" is employed. Such an area includes all the work done on a specific part of the distribution job. The hours worked and wage costs of office employees, warehousemen and routemen are charged to what they are working on rather than where or under whose supervision they work. This is a departure from accepted cost accounting theory, but it is workable—and it is simple.

Several of these functional areas are classifiable under the broad but technical category of "regulation," a term which will need to be frequently used in these pages, and therefore, should be defined at this point. Regulation means the recordkeeping of sales of each issue by each retailer in order to determine future allotments of a publication to the dealers. The term also embraces the work of the routemen visiting the dealers at intervals and shifting copies of current issues of magazines among stands. Not all magazines are regulated.

The following table distinguishes functional areas to which wage costs appertain, grouped under four general headings. The unit cost factors developed for each function are also shown:

FUNCTIONAL AREA	UNIT COST FACTOR
Regulation	
Primary Distribution — Record keeping on copies delivered and returned to each issue—by dealer—including preparation of invoices.	Cost per unit per dealer: $\frac{\text{Payroll Costs}}{\text{Number of issues distributed x number of dealers}}$

MODEL NEWS AGENCY, INC.

Summary of Operations

Last 4 Weeks, 1951 and Year 1951

	THIS PERIOD	THIS YEAR	FOUR WEEK 1951	AVERAGE 1950
Gross sales	$131,000	$1,390,000	$115,800	$126,000
Provision for returns	34,000	361,400	30,100	28,200
Net sales	$ 97,000	$1,028,600	$ 85,700	$ 97,800
Purchases	$107,400	$1,140,000	$ 95,000	$102,700
Returns to distributors	27,900	296,400	24,700	23,000
Net purchases	79,500	843,600	70,300	79,700
Commission earned	17,500	185,000	15,400	18,100
Operating Expenses	12,900	148,300	12,400	11,700
OPERATING PROFIT	4,600	36,700	3,000	6,400
Add: Waste paper sales	—	4,900	400	200
Other income (net of expense)	—	800	100	600
PROFIT BEFORE INCOME TAXES	4,600	42,400	3,500	7,200
State and Federal Income Taxes	2,000	17,200	1,400	2,900
NET PROFIT	$ 2,600	$ 25,200	$ 2,100	$ 4,300

EXHIBIT 1

Checkup Records — Recording the number of copies unsold at each checkup and compiling interim sales information for the distributor. Also, posting number of copies redistributed during "on-sale" period.

Cost per dealer checkup:

$$\frac{\text{Payroll Costs}}{\text{Number of issues checked x number of dealers}}$$

Delivery

Warehousing and Handling—Checking and handling incoming magazines, counting and bundling dealers' allotments, and loading into delivery trucks.

Cost per thousand copies:

$$\frac{\text{Payroll costs}}{\text{Thousands of copies distributed}}$$

Trucking—Transportation of bundles to the newsstands and placing the copies on the racks.

Cost per issue per dealer:

$$\frac{\text{Payroll costs}}{\text{Number of issues handled x number of dealers}}$$

Dealer Checkup

Work of the routemen in visiting the dealers to check the number of copies of regulated issues on hand and giving additional copies or removing copies, as the case may be.

Cost per checkup:

$$\frac{\text{Payroll Costs}}{\text{*Number of checkups x number of dealers.}}$$

*Some magazines are checked once, some as many as three times. This factor must be taken into consideration here.

Returns	
Regulated Returns — Counting returns of regulated magazines and recording (by dealer) on the issue records. Also, stacking returns by issue.	Cost per thousand regulated returns: Payroll Costs / Thousands of copies of regulated copies returned.
Unregulated Returns—Stacking and counting returns of unregulated magazines by issue, stripping and counting covers.	Cost per dealer: Payroll Costs / Number of dealers

In addition to the above areas, the magazine wholesaler has the usual overhead salaries and wages for supervision, accounting, general warehouse labor, etc. These are distributed on the basis of the wage costs of the functional areas.

Other Expenses

The only other expenses which require constant attention are those connected with the delivery equipment. The following accounts—with sub-accounts for each route—are sufficient for the average wholesaler:

1. Gas and Oil
2. Truck repairs
3. Truck depreciation
4. Truck insurance, licenses, etc.

The operating executive makes periodic comparisons of how much he is paying per mile for gas, oil and repairs of each truck. He also receives a yearly report on the cost per mile of all truck expenses.

Summary of Operations: The Problem of Returns

The top monthly operating statement gives special emphasis to dealer returns. Sales returns are much more of a problem with the magazine wholesaler than in other businesses. Fluctuation in the rates of returns produces a great effect on his gross profit and operating expenses. Among other things, the Summary of Operations (Exhibit 1) features returns information. Supplementing the top statement is a short statistical report:

	THIS PERIOD	THIS YEAR	FOUR WEEK AVERAGE 1951	1950
% of dealer returns to sales	25.9%	25.9	25.9	22.4
% of returns to distributors to gross purchases	25.9	25.9	25.9	22.4
% commission to net sales	18.0	17.9	17.9	18.5

The first line—on the data supplied—shows an upward trend in returns which must be investigated. The reason may be ineffective checkups by certain routemen, lack of control over dealers returning copies before the issue is "off

Model News Agency, Inc.

Analysis of Operating Expense

Last 4 Weeks 1951 and Year 1951

	THIS PERIOD	FOUR WEEK 1951	AVERAGE 1950
Payroll Costs			
Regulation	$ 1,120	$ 1,080	$ 890
Delivery	2,510	2,360	2,200
Collections	1,210	1,160	1,080
Dealer Check-Up	1,820	1,800	1,690
Returns	1,610	1,450	1,440
	$ 8,270	$ 7,850	$ 7,300
Delivery Equipment Costs			
Gas and oil	$ 300	$ 280	$ 270
Truck repairs	200	230	200
Depreciation	200	200	190
Insurance, etc.	80	80	70
	$ 780	$ 790	$ 730
Overhead			
General warehouse wages	$ 380	$ 380	$ 360
General office wages	470	450	430
Administrative salaries	2,000	2,000	2,000
Rent, heat and light	430	420	410
Warehouse supplies	180	160	140
*Other selling and administrative expense	390	350	330
	3,850	3,760	3,670
TOTAL OPERATING EXPENSE	$12,900	$12,400	$11,700

* A separate listing of these expenses is given management. This report, which is of conventional form, has been omitted here.

EXHIBIT 2

sale" or just poor sales conditions. At any rate, the condition is highlighted here. The second line of figures is a proof of internal control. These percentages are identical with the first line, showing that there are no slip-ups in charging the returns back to distributors and that fraudulent credits are not being issued by someone in the warehouse or office. The third line shows the wholesaler that lines he is distributing this year are not as profitable as last year's.

Analysis of Operating Expense: Focus on Labor Costs

Management needs another operating statement each period, a summary of the cost of operations. This is shown in the Analysis of Operating Expense (Exhibit 2). It is apparent that Payroll costs are by far the largest segment

of a wholesaler's operating expense and must be watched closely. The operating executive needs full details on wage costs. The following additional report, detailing the wage costs of regulation, brings out changes in hourly rates, effect of excessive overtime, and abnormal trends in total wage costs:

REGULATION COSTS

	TOTAL COST	WAGES	OVERTIME PREMIUM	VACATION ACCRUAL	PAYROLL TAXES, INSURANCE, ETC.
Wage Cost					
Primary Distribution					
This period	$630	530	50	25	30
Average 1951	620	530	40	25	30
Average 1950	470	430	—	20	20
Checking Records					
This period	490	410	40	15	25
Average 1951	460	400	20	15	25
Average 1950	420	365	20	15	20
Cost Per Labor Hour					
Primary Distribution					
This period	xxx	1.252	.118	xxx	xxx
Average 1951	xxx	1.198	.082	xxx	xxx
Average 1950	xxx	1.124	—	xxx	xxx

A similar report form is used for the other cost areas: delivery, dealer checkup, returns and collections.

Magazine wholesalers, like most businesses, are subject to sharp fluctuations in activity. The report below spotlights trends in hourly production in a functional area and is made up for each cost area.

REGULAR PRODUCTION

	THIS PERIOD	FOUR WEEK 1951	AVERAGE 1950
Primary Distribution			
Labor Hours	423	484	288
Number of dealer-issues checked	27,400	25,300	21,250
Hours per dealer-issue	.0154	.0191	.0135
Checkup Records			
Labor Hours	398	399	379
Number of dealer-issues checked	27,400	25,300	21,250
Hours per dealer-issue	.0145	.0181	.0179

This report flags a questionable condition in primary distribution. With increased activity, the hourly production should have dropped, as it did in the checkup records function. Instead, it has risen sharply from 1950.

Data on Profit by Distributors' Lines

The operating executive does not need profit determination reports monthly. A quarterly review will suffice.

PROFIT AND LOSS STATEMENT—DISTRIBUTOR X's LINE

	TOTAL	PUBLICATION A	PUBLICATION B
Copies purchased—gross	30,150	18,400	11,750
Copies returned	16,350	9,520	6,930
Net purchases—copies	13,800	8,980	4,820
Commission per copy	xx	$.045	$.025
Commission	524.60	$404.10	$120.50
Wage Costs			
Primary distribution (1)	92.74	46.37	46.37
Checking records (2)	71.52	35.76	35.76
Warehousing and bundling (3)	85.21	52.04	33.17
Trucking	31.22	15.61	15.61
Dealer checkings (3)	36.40	18.20	18.80
Regulated returns (3)	80.11	46.16	33.95
Collections (4)	—	—	—
	$397.20	$214.14	$183.06
Out-of-Pocket Profit or (Loss)			
Delivery Equipment and Overhead Expense (5)	$217.40 $221.52	$189.96 $119.01	($62.56) $102.51
NET PROFIT OR (LOSS)	($94.12)	$ 70.95	($165.07)

NOTES

1. There were 2,400 dealer checkups on Publication A and a like number on Publication B during the six-month period. We saw in the specimen reports that primary distribution required .0154 hours per dealer checkup and that the average wage cost in this area was $1.252 per hour. 2,400 x (.0154 x $1.252) = $46.37.
2. Developed in the same way, the unit production here was .0145 hours per checkup and the hourly wage cost was $1.029. 2,400 x (.0145 x $1.252) = $35.76.
3. Space does not permit a detailed description of these calculations but they are all simple projections of the unit production factor, the wage cost per hour and the actual activity, i.e. copies distributed and copies returned.
4. Collection costs are related only to the number of dealers serviced. The number of magazines handled do not influence them.
5. This expense is spread on the allocated wage dollar. The wholesaler's actual ratio of delivery equipment and overhead expense is 53.1%. This is applied to the $397.20, $214.14 and $183.06 to secure the overhead figure.

EXHIBIT 3

The magazine wholesaler knows that some of his lines are profitable. He refers to them as his "bread and butter" lines. But he has a continuous doubt about new lines and certain old ones. Every quarter he receives a report like the one presented in Exhibit 3 on the doubtful distributors. The number of copy sales used in the report covers the past six-month period. The unit costs are current ones.

From this distributor statement the operating man sees at a glance that he is making money on only one publication. He is actually out of pocket on Publication B. The chief reasons for B's showing is that checkup records and dealer checkup costs are far out of line. The wholesaler may ask the national distributor to let him omit checkups. He also sees that the returns (6,930) are running about 60% of the draw (11,750).

Data on Profit by Individual Routes

Another tool for control of distribution costs is the quarterly Route Profit Report (Exhibit 4). This report compares the income of all the routes and measures them against past performance. It is illustrated here for two routes only. It will include many more. It is an effective device for finding what routemen are falling down on the job. In addition, it discloses the shifts in buying power which accompany movement of various population groups, a factor which often calls for alteration, consolidation or splitting of routes.

The route profit report is compiled in this way. The income for each route is based on the cash receipts for the three-month period instead of net sales. The vast number of transactions within a territory make it impractical to keep sales records by route. Instead, the cash collections of each route are used. These are easily obtained from the cash journal which is columnarized by route. (The variation between sales and collections in the period are negligible.) Commissions (gross profit) are figured at the wholesaler's current percentage of commissions to sales. This ratio will vary little from territory to territory. Actual routemen's wages, including overtime, are used. To the wages are added a flat percentage to cover vacations, payroll taxes, insurance, etc. In this case the loading for other payroll costs is nine and one half per cent. Delivery equipment costs are taken from the sub-accounts in the expense ledger.

Loss and Marginal Dealer Report

The amounts used in Exhibit 4 show that Route 2 is a marginal proposition. Unlike Route 1, it is producing less revenue than a year ago. The wholesaler has to do something about it. If the dealer is satisfied that the routeman is doing an intelligent, conscientious job, he turns to an accompanying report, the Loss and Marginal Dealer Report (Exhibit 5). This report is a simple listing of low volume dealers in each territory. The wholesaler usually eliminates loss dealers automatically, and if there are too many marginal producers, he goes to his dealer location map and starts making some changes.

MODEL NEWS AGENCY, INC.

Route Profit Report

Fourth Quarter, 1951

	ROUTE 1 (SMITH)	ROUTE 2 (MORRISON)
Collections	$26,000	$19,500
Commissions (18.0%)	$ 4,716	$ 2,510
Routemen's wages	1,310	1,240
Payroll extras (9.5%)	124	118
Truck expense	350	310
Other direct distribution wage costs (3.8% of collections)	996	741
Total	$ 2,780	$ 2,409
Profit or (Loss) before overhead	$ 2,036	$ 1
Overhead (42.0% of total wage costs)	1,022	822
Net profit or (Loss)	$ 1,014	($ 881)
Last Quarter — Actual		
Commissions	$ 4,309	$ 2,316
Net Profit or (Loss)	$ 762	($ 862)
This Quarter Last Year		
Commissions	$ 4,512	$ 2,940
Net Profit or (Loss)	$ 714	($ 317)
Commissions		
This Quarter	$ 4,716	$ 2,510
Last Quarter Adjusted*	4,682	2,517
Last Year	4,512	2,940

* Adjusted to the wholesaler's seasonal index. He has learned that his overall sales follow a definite monthly pattern if not disturbed by economic changes. This adjustment puts the slow third quarter on a basis comparable to the brisk fourth quarter.

EXHIBIT 4

The cost procedure used to determine dealer profitability is an interesting one. Again, actual costs on the particular route are combined with company averages of commission rates and all other costs. A clerk is furnished the loss and "not absorbing overhead" figures, and thumbing through the accounts receivable records, she spots the dealers whose weekly payments appear to be in this group. She takes an average of the last four weekly settlements and, if they fall in one of the two categories, their names and weekly sales appear on the report.

Actual wages and truck expense shown on the route profit report are divided

MODEL NEWS AGENCY, INC.

Loss and Marginal Dealer Report

Four Weeks Ended December 31, 1951

		ROUTE NO. 1 (SMITH)
		Dealer Sales Volume
	Producing out-of-pocket loss	$25.50
	Not absorbing overhead	$29.80
DEALER		December Average Weekly Sales
39	Joe's Luncheonette	26.35
44	Ideal Pharmacy	18.12
69	M. Wilson	29.14
84	Johnson's	22.30
85	Busy Bee	23.42
92	Trackside Restaurant	19.10

EXHIBIT 5

by 13 for a weekly average. Average wage costs per unit, developed in the current period's wage cost reports, are used for the other functional expenses. Overhead is applied on the company's current ratio to wage costs.

A Set of Reports

The last report rounds out the wholesaler's operating reports. The complete set tells him about all what figures can tell him. True, there are places in the report system and the cost techniques where the cost accountant could make refinements. But the writer knows of no cost procedure for this industry which is more usuable or more simple. The reports focus attention on the all-important matter of results obtained from operating effort and they are of the problem location or trouble-shooting variety. Whether it be the distributor and one or more of his periodicals or a route and one or more of the dealers on it, the wholesaler is put in a position to think and act.

The report structure and cost methods which have been described were designed for companies distributing magazines only. Many companies distribute newspapers as well and some handle merchandise like razor blades and stationery. The basic reports and techniques outlined here can be expanded to fit these types of wholesalers also.

Standard Costs in a Hosiery Mill

by C. R. PINCSAK

Chief Cost Accountant, Pullman Car Works, Pullman Standard Car Manufacturing Co.

In capsule style, there are set forth in the present article the principal preliminary moves and procedural features characterizing the standard cost system now in operation in the company providing the background of experience for the paper. Illustrated are basic forms availed of.

THIS ARTICLE SEEKS TO OUTLINE a standard cost system which proved workable in a specific hosiery mill.

A survey was made of the plant lay-out, manufacturing techniques, and items produced. The mill has two main manufacturing departments, knitting and finishing. The knitting department includes the twisting and winding room where yarns of various types are combined and wound on singular cones to be used in the knitting of the various stockings. When the knitting operations are completed, the stockings are delivered to a storage area called grey goods storage. The stockings at this point are the color of the natural yarn used and are stored until sales orders are received, at which time they are dyed, boarded, and prepared for shipment to the customers. This procedure results in stockings being knit on the basis of the sales forecast for grey goods storage, but finished on the basis of orders received.

From Basic Data to Specification and Standard Cost Sheets

Using past experience, present operations, or a projection of future developments, a list was compiled of the various types and the quantities of yarns used in the manufacture of each type of stocking. This information, by type of stocking, was then assembled on specification sheets, Exhibit 1 used also for labor, and representative of the knitting department processes. The next step was to study the various labor operations involved and to determine the time spent in each manufacturing operation, allowing for stoppages not under the control of the machine or hand operator. The time was recorded on the sheets.

The biggest problem which entered into the installation of the cost system was the distribution of burden. To allocate the overhead or factory expense equitably, the knitting and finishing departments were divided into twelve manufacturing

SPECIFICATION SHEET—KNITTING

Style — 1 SB
Gauge — 20
Htg. Unit — 1 dz. pr.
Size — 10 Seamed — Yes

MATERIALS REQUIRED

	Gross Lbs.	Waste	%	Net
Yarn	.272	.002	.9	.27
Yarn	1.312	.012	.9	1.30
TOTAL	1.584	.014	.9	1.57

LABOR REQUIRED

Operation No.	Std. Hrs. per Mfg. Unit	No. of Units per Mfg. Unit	Burden Center	No. of Opers.	Std. No. of Units Per Hour	P. W. or T. W. Rate
1000 Regular Knit	.283	1 doz. pr.	10	1	4	.35
2001 Inspect	.09	1 doz. pr.	12	1	15	.09
2002 Hem	.07	1 doz. pr.	16	1	18	.08
2003 Turn	.04	1 doz. pr.	16	1	40	.04
2004 Seam	.09	1 doz. pr.	16	1	15	.10

Figures used are illustrative only and do not reflect actual specifications.

EXHIBIT 1

burden centers. The various expense items—such as supplies, indirect labor, repairs and maintenance, fixed charges, depreciation, taxes, and management charges—were computed based on past experience and future expectations. In addition to the manufacturing burden centers, auxiliary burden centers such as general building, receiving, shipping, printing, etc., were also created. The total expenses of the auxiliary burden centers were computed and distributed to the manufacturing burden centers on the basis of usage, area occupied, etc.

After compiling the total expense of each of the manufacturing burden centers, the appropriate activity base was determined. Various bases were considered, including labor hours, machine hours and units produced to arrive at the base for each individual burden center. After deliberation two bases were used throughout the plant; machine hours in those burden centers in which that basis appeared most equitable, and direct labor hours in the remaining burden centers. In the direction of completing underlying information needed, and of expressing the relationship of operation to overhead costs the time applicable to each operation involved was computed and this, as well as the burden center the work was performed in, was entered on the specification sheet.

The steps taken to this point provided for establishment of standards and control over the basic raw materials, labor and burden. However, still to be considered were packing materials, such as labels, boxes, paper, etc. A study of these items indicated that complete control of them would not be worth the

SPECIFICATION SHEET—FINISHING

Style — 1 SB Mfg. Unit — 1 dz. pr.

MATERIALS REQUIRED

	Gross	Waste	%	Net
Dyestuffs— Formula 2A2	$.10	—	—	$.10
Labels	2	—	—	2
Boxes	2	—	—	2

LABOR REQUIRED

Operation No.	Std. Hrs. per Mfg. Unit	Std. Quantity per Mfg. Unit	Burden Center	No. of Opers.	Std. No. of Units Per Hour	P. W. or T. W. Rate
10001 Dye	.08	1 lb.	20	1	15	.10
10002 Pound	.03	1 doz. pr.	23	1	90	.03
10005 Board	.08	1 doz. pr.	24	1	20	.09
20001 Pair	.06	1 doz. pr.	28	1	22	.07
30001 Box	.06	2 boxes	28	1	18	.07

EXHIBIT 2

clerical effort involved. It was decided to consider them part of the material cost and to charge them in and out of production at the quantity called for on a specification sheet for finishing (Exhibit 2). Usage variance was to be included in the quantity variation at the time of a physical inventory.

The information contained on the specification sheet was transcribed to a Standard Cost Record (Exhibit 3) for each type of stocking on which each item of cost was extended at its standard unit value and the cost for each product was summarized. These standards were used for the costing of production, inventories, and cost of sales.

Accounting Procedure

With the completion of the specification and cost sheets, the manufacturing process was studied to determine the various cutoff points at which the flow of materials could be measured and recorded through the general ledger accounts, and a cost entry procedure was established.

To begin with, at the time materials were purchased, they were costed at the standard value. The variation between standard and actual cost was transferred to a material price variance reserve account. Each invoice was allocated to particular produce grouping—cotton, wool, etc. Later, the purchases for each period were summarized by product groupings, and by using the "fifo" method of costing sales, the material price variance reserve was charged or credited, with the contra entry to the profit and loss account.

Mfg. Unit _____ STANDARD COST RECORD SYMBOL _____

MATERIALS REQUIRED	SYMBOL NUMBER	UNIT	GROSS QUANTITIES	UNIT COST	AMOUNT
TOTAL MATERIAL					

Labor

Description of Operations	Operation #	B.C.	T.W.P.W.	Hours or Pieces	Rate	Amount
TOTAL LABOR						

Burden

Cross Index Reference	Operation #	B.C.	T.W.P.W.	Hours or Pieces	Rate	Amount
TOTAL BURDEN						

SUMMARY

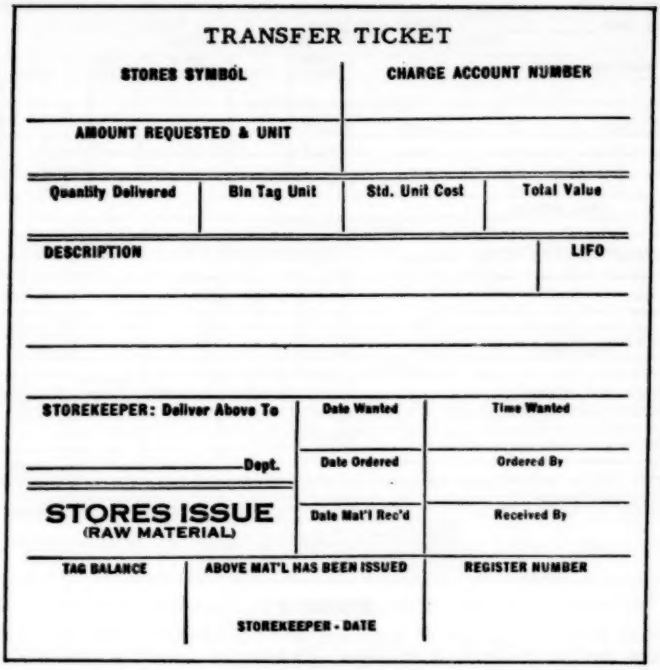
MATERIAL		
LABOR		
BURDEN		
TOTAL UNIT COST		

EXHIBIT 3

From the raw material stores room, the materials issued to production were sent to either the twisting and winding room, or to one of the various knitting departments. A Transfer Ticket (Exhibit 4) was made out for each issue of materials. This ticket contained the basic information as to type of material, quantity, and the account number to be charged. Summarizations of these tickets were made periodically and the entries recorded in the general ledger accounts.

If the raw materials were sent to the twisting and winding room, a further record of the production of twisted yarn was recorded as the materials were sent to the knitting department. The Production Record (Exhibit 5) was forwarded to the cost department. A journal entry was prepared periodically, crediting the twisting and winding room and charging the knitting department.

As materials were knitted into stockings, a production record sheet was maintained on the stockings sent to grey goods storage. From these records, the knitting department received credit and grey goods storage was charged for the standard value of the stockings. As stockings were withdrawn from grey goods storage, they were charged to the finishing department, and as shipments were made, finishing department was credited, with offset to cost of goods sold.



TRANSFER TICKET

STORES SYMBOL		CHARGE ACCOUNT NUMBER	
AMOUNT REQUESTED & UNIT			
Quantity Delivered	Bin Tag Unit	Std. Unit Cost	Total Value
DESCRIPTION			LIFO
STOREKEEPER: Deliver Above To _____ Dept.		Date Wanted	Time Wanted
		Date Ordered	Ordered By
STORES ISSUE (RAW MATERIAL)		Date Mat'l Rec'd	Received By
TAG BALANCE	ABOVE MAT'L HAS BEEN ISSUED STOREKEEPER - DATE		REGISTER NUMBER

EXHIBIT 4

Variance Development and Use

The control points thus introduced, together with the taking of a periodic physical inventory, enabled manufacturing variances to be computed. These variances included material usage, labor, and burden variance, as well as burden over or under absorbed. Management was enabled to measure actual results against the standards set and, once reasonably correct standards were established, the variances resulted in a measurement of efficiency for the various elements of cost. After the variances have been computed each month and the entries have been recorded on the general books, the job of preparing analyses begins. A review is made of each department and burden center in which disproportionate variances have occurred. Each component of cost is analyzed individually.

In material usage variances, for example, it has been found, that in some instances, incorrect inventory had been reported or that the amount of materials from one department did not tie-in with the receipts of another. Whatever the

DEPARTMENT PRODUCTION RECORD

Product Description _____ Department _____

Symbol Number _____ Unit _____

DATE	ORDER NO.	QUANTITY	DATE	ORDER NO.	QUANTITY

REMARKS

TOTAL QUANTITY AND UNIT		
STANDARD COST	UNIT	TOTAL
MATERIAL		
LABOR		
BURDEN		
TOTAL		

EXHIBIT 5

cause, steps are taken to correct each situation until a true operating variance is obtained. Labor variances are traced back to specific operations, and if in setting standards, incorrect allowances are found to have been used, the standards are adjusted. Burden variances and over- or under-absorbed burden are investigated and appropriate adjustments made. Each period a report is made up and sent to management, which amplifies and explains the variances as recorded on the financial statements. Foremen are informed of the results for their respective departments and use the variance analyses as a guide.

A Satisfactory Step

Experience gained thus far has indicated that the time and effort spent in the installation of the cost system was a wise and sound investment. Decisions in regard to individual products can be made with the knowledge of concrete facts. The effects of the addition of new products can be calculated before the products are added to the line. Foremen are able to spot the operations where planned efficiency is not being or maintained. The sales department has a sound gross profit picture from which it is possible to make better decisions.

THE WORKSHOP

The Calculation of Variances

by N.A.C.A. RESEARCH STAFF

As background for N.A.C.A. Research Series 22 entitled The Analysis of Manufacturing Cost Variances, *and published as Section 2 of the* N.A.C.A. Bulletin, *August 1952, an inquiry into the logical and mathematical foundation which underlies the techniques of variance calculation was made by the research staff. The material developed in this inquiry, here presented at the suggestion of the Committee on Research, may be of interest to accountants who wish to examine the theoretical basis for current methods of calculating cost variances. In addition, awareness of the different methods which exist in areas such as the calculation of overhead variances may help avoid confusion.*

VARIANCES FROM DIRECT COSTS are caused by deviations from the projected quantities of materials incorporated in the standards and also by deviations from the projected prices for these materials, which have also been incorporated in the standards. It is assumed that price and quantity are the only two variables present, and this assumption is implicit in the method of computation of these direct cost variances.

Computation of Price and Quantity Variance

A price variance, as usually determined in practice, may be stated as the difference between standard and actual unit price times the *actual* number of units purchased. The quantity variance is then calculated as the difference between standard and actual quantities times the *standard* price per unit. The following figures illustrate the computations.

Standard price per unit	$ 1.00
Actual price per unit	1.10
Standard quantity	100 units
Actual quantity	120 units
Price variance $1.00 minus $1.10) times 120 units	12.00
Quantity variance (100 units minus 120 units) times $1.00	20.00
Total variance ($100 minus $132)	$32.00

However, when the problem of calculating these variances is viewed solely from the mathematical standpoint, there are alternative methods of calculation which yield different re-

sults. For example, price and quantity variances could be calculated as follows:

Price variance ($1.00 minus $1.10) times 100 units	$10.00
Quantity variance (100 units minus 120 units) times $1.10	22.00
Total variance	$32.00

In fact, an application of mathematical analysis alone leads to the conclusion that the total variance traceable to price alone can be determined only when no quantity variance is present. Likewise, the "pure" quantity variance can be determined only in the absence of a price variance. Whenever both actual price and actual quantity differ from the corresponding standards, a portion of the overall variance (i.e., the combined price and quantity variance) is a joint product of price and quantity differences. A diagram illustrating the above statements is shown as Exhibit 1.

In this diagram, area D is the joint result of price and quantity variances. Just as it is not possible to say what part of the area of a rectangle is ascribable to length and what part to height, it is impossible to say that any portion of the joint variance amounting to $2.00 is caused by either price or quantity by itself.

The first method of computing variances illustrated above includes area D with area B to make up the price variance. The second method combines area D with area C to form the quantity variance. Still another method has been suggested by a writer on the subject who proposes that area D be divided between the price and quantity variances.[1]

The methematical logic underlying variance computations offers no guidance in choosing from the possible alternatives in disposition of the joint product of the two variances—i.e., area D. Instead, the answer must be sought by asking what method yields information most useful to management.

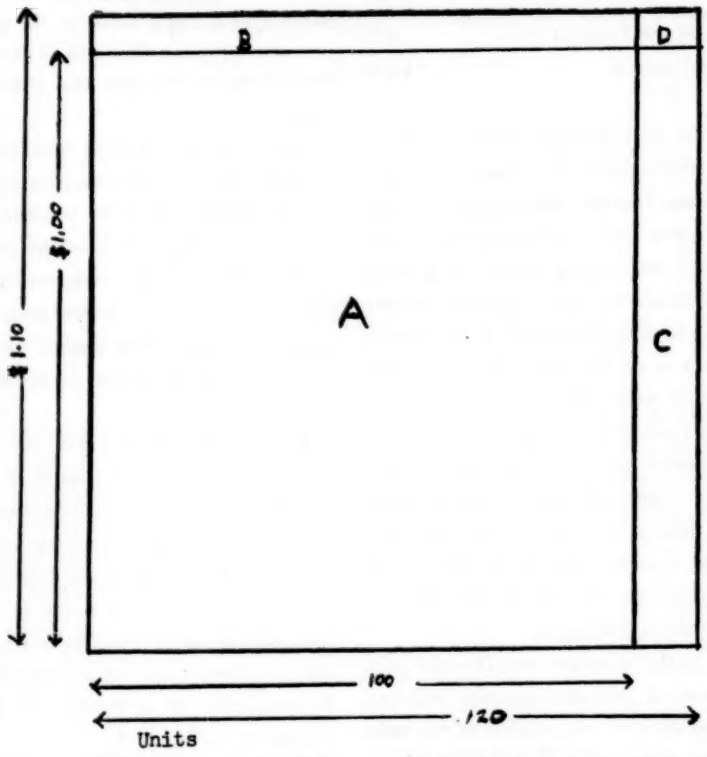
The cost accountant's primary objective in computing variances is to provide management with information which is useful in controlling costs. This objective is best accomplished by measuring variances in terms of responsibilities rather than in terms of cost factors such as price and quantity. As expressed by a member of the Committee on Research:

> "One of the failings of the so-called 'actual' cost systems was that by prorating all costs back to the operating department, controllable and non-controllable costs were so intermingled that the operator could be held responsible for very little of them.
>
> "If we are to accept the principle that an operator should be held responsible only for those variances which are

[1]See Lawrence L. Vance, "The Fundamental Logic of Primary Variance Analysis," *N.A.C.A. Bulletin*, January 1950.

RELATIONSHIP OF PRICE AND QUANTITY VARIANCE "AREAS"

Standard price per unit	$1.00
Actual price per unit	1.10
Standard quantity	100 units
Actual quantity	120 units



The area designated as "A" represents the standard cost (100 units @ $1); area "B" is the variance ascribable solely to the price variance of $0.10 per unit (100 units @ $0.10); area "C" is the variance ascribable solely to the excess quantity (20 units @ $1); area "D" is the remaining portion of total variance due to excess price times excess quantity. (20 units @ $0.10).

EXHIBIT 1

under his control, there can be only one answer. One of the fundamentals of the responsibility type of standard cost accounting is that each responsibility head shall be charged for the materials and services which he uses at a standard cost. No variances are transferred from any anterior department or process. This guarantees that he will be held responsible only for the variances arising from

his own operations. In the example given, therefore, in my opinion quantity variance should be only the excess units over standard used times their standard value. To charge the operator with any of the price variance on the extra units used would introduce an element over which he has no control."

Those individuals in the organization who are responsible for exercising control over the quantity of materials used are not ordinarily responsible for the unit price paid for the material. Placement of responsibility for cost control therefore requires a dollar quantity variance which is directly proportional to the physical units of material in the quantity variance. This is accomplished by extending the physical quantities by the standard unit price.[2] Similarly, management in charge of the purchasing function does not control the quantity of material used, and to the extent that responsibility can be placed for the price of materials purchased, this responsibility is limited to the unit price paid. Hence the significant price variance is the difference between standard and actual unit prices and the total amount of this variance depends upon the number of units actually purchased.

Occasionally, circumstances may arise in which the above described method does not bring all of the facts needed to establish responsibility for variances. For example, one company found that excess usage of materials not carried in stock required additional purchases at premium prices. Moreover, there had been frequent use of the company's toolroom to manufacture component parts when stocks were exhausted by excess spoilage. Here the real cost of the quantity variances was substantially increased by paying higher prices for materials needed to complete orders or to meet promised delivery dates. When this situation was brought to management's attention, a program to reduce waste and spoilage of materials was instituted. While situations such as this do not mean that customary methods for computing price and quantity variances need to be changed, they indicate that there is need for study to ascertain the basic facts that underlie variances.

Overhead Variances

The total overhead cost variance measures the difference between standard overhead cost absorbed by production and the actual amount of overhead cost incurred during the period. Its analysis is more complicated than the analysis of variances from direct costs, since it entails consideration of volume as a third variable, in addition to price and quantity which are the

[2]This relationship is not maintained by use of any other price. For example, using the second method illustrated above in which the physical quantity variance is multiplied by the actual unit price, the dollar quantity variance changes when the actual price paid for the material changes, even though the quantity excess remains the same.

two variables present in direct cost analysis. The overall variance is ordinarily broken down into two or three separate variances. However, different methods for determining these overhead variances are to be found in the literature and in practice. These methods and the differences among them are described below.

Primary Overhead Variance Components

Methods for determining overhead variances make use of four primary components which are combined in different ways to produce two or three variances. These components are not computed separately in practice, but they underlie the methods used and are basic to an understanding of the differences between the various methods. Terms used below to designate the variance components have been coined for descriptive purposes.

A. "Budget controllable component," due to spending more (or less) than the amount allowed by the flexible budget for the actual man or machine hours. This variance is calculated as the difference between the amount of expense budgeted for the actual man or machine hours and the actual amount of expense incurred during the period.

B. "Excess hours controllable component," or the excess (or saving) in variable cost incurred because actual hours exceed (or are less than) the standard hours. This variance component is the difference between overhead cost allowed for the number of standard man or machine hours and the overhead cost allowed for the number of actual hours.

C. "Excess hours volume component," or the amount of fixed cost underabsorbed (or overabsorbed) due to use of more or fewer) hours than standard for the volume of production attained during the period. This component can be calculated as the difference between the amount of fixed cost applied to production (i.e., standard hours produced times a rate based upon budgeted cost for standard or normal volume) and the amount of standard fixed cost applicable to the actual number of man or machine hours.

D. "Capacity volume component," or the amount of fixed cost underabsorbed (or overabsorbed) because the number of actual man or machine hours falls short of (or is greater than) the standard or normal capacity, measured in hours. This component can be calculated as the difference between total standard fixed cost for the period and the amount of standard fixed cost applicable to the actual hours.

The derivation of the above components is illustrated by means of a diagram and numerical example in Exhibit 2. For purposes of the example, the following data are assumed.

Flexible overhead cost standards:		
Fixed cost, per month		$200
Variable cost, per standard hour		$ 1
Standard (or normal) volume, in standard hours per month		100
Standard overhead rate, per standard hour:		
Fixed component, $200/100 hours	$2	
Variable component, per standard hour	1	$ 3
Actual overhead cost incurred for month		$303
Actual man or machine hours in month		94
Standard hours allowed for production during month		90

Analysis Plans Using Two Variances

The field studies show that most companies using standard costs de-

[3]This method is described by Reitell and Harris, "Cost Accounting," published by International Textbook Co., 1948.

velop two overhead variances. These are generally called *controllable variance* and *volume variance*.[3] The controllable variance is made up of components A and B described above, while the volume variance includes components C and D. Computation of these variances, using the above, follows:

"Normal" production volume per month		100 Standard Hours
Actual overhead expense for month		....$303
Expense allowed for standard hours produced:		
Fixed	.....$200	
Variable (90 hours @ $1)	 90	290
Controllable Variance		$ 13
Overhead expense allowed for standard hours produced:		
Fixed	.....$200	
Variable (90 hours @ $1)	 90	$290
Overhead expense absorbed by production:		
Standard rate is $300/100 or $3 (90 hours @ $3)		270
Volume variance		$ 20

Determination of the two variances ordinarily accompanies the use of a flexible budget which permits calculation of expense allowances for various volumes within the range of fluctuation normally expected, although these two variances may be calculated from a fixed budget when circumstances justify its use. If all units produced in the cost center are identical, volume may be measured in terms of number of units. Since this is usually not the case, volume is ordinarily measured in man hours for man operation cost centers and in machine hours for machine operation cost centers.

If hours are used, volume should be measured in standard hours, not in actual hours. This follows from the fact that standard hours are directly proportional to physical units produced in a cost center while the ratio of actual hours to physical units fluctuates. In other words, an increase in the actual hours required for a given quantity of production, in the absence of other variables, indicates decreased efficiency, not increased volume. In practice, volume is sometimes approximated by adding a small portion of actual or estimated hours to standard hours because it may not be economically justifiable to standardize 100% of the production. Standard labor dollars are directly proportional to physical production when standard labor rates are constant within a man operation cost center and the desired production volume statistics are often more easily accumulated in terms of labor dollars.

The volume variance consists of standard fixed cost dollars over or under absorbed while the controllable variance includes cost differences arising from operation of all other variables. This includes any differences between the actual and budgeted amounts for fixed expenses. However, the controllable variance is primarily a measure of differences between the amount of variable expense allowed in the flexible budget for the number of standard hours produced and the ac-

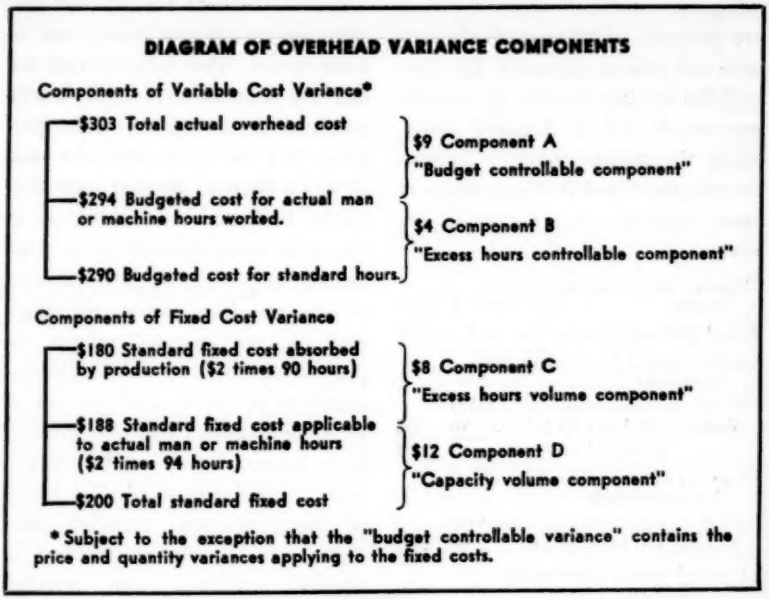


DIAGRAM OF OVERHEAD VARIANCE COMPONENTS
Components of Variable Cost Variance*
$303 Total actual overhead cost
$9 Component A
"Budget controllable component"
$294 Budgeted cost for actual man or machine hours worked.
$4 Component B
"Excess hours controllable component"
$290 Budgeted cost for standard hours.
Components of Fixed Cost Variance
$180 Standard fixed cost absorbed by production ($2 times 90 hours)
$8 Component C
"Excess hours volume component"
$188 Standard fixed cost applicable to actual man or machine hours ($2 times 94 hours)
$12 Component D
"Capacity volume component"
$200 Total standard fixed cost
* Subject to the exception that the "budget controllable variance" contains the price and quantity variances applying to the fixed costs.

EXHIBIT 2

tual amount of variable expense incurred.

Where direct labor is included with overhead and applied to production at a combined rate, the above variances include direct labor variances.

The controllable variance is broken down by departments corresponding to responsibilities, and for each responsibility, variances are determined for each item of expense (e.g., supplies, indirect labor, etc.). These latter are differences between the amount of expense allowed for the number of standard hours produced and the actual overhead costs for the period. Further analyses to determine causes of variances for individual expense items can be made if desired.

One company interviewed in the field study separates component B (i.e., the excess variable expense ascribable to using more than the standard number of hours to manufacture the number of pieces produced) because this makes clear the fact that efforts to control the variance must be directed toward avoiding excess direct labor rather than toward the overhead expenses themselves. The company representative pointed out that such control is important because savings in variable overhead as well as in direct labor mean direct savings in out-of-pocket cash expenditures.

TABULAR SUMMARY OF OVERHEAD VARIANCE ANALYSIS METHODS

TWO VARIANCE METHOD		PRIMARY COMPONENTS	THREE VARIANCE METHODS Method 1	Method 2	Method 3
Total Variance (A+B+C+D)	Controllable Variance (A+B)	A—Budget Controllable Component—Actual burden dollars for month less flexible budget allowance for standard hours corresponding to actual hours used for actual production in month.	First Variance (A)	First Variance (A+B)	First Variance (A)
		B—Excess Hours Controllable Component—Flexible budget allowance for standard hours corresponding to actual hours used for actual production in month less flexible budget allowance for standard hours allowed for actual production in month.	Second Variance (B)		Second Variance (B+C)
	Volume Variance (C+D)	C—Excess Hours Volume Component—Fixed component of standard burden rate times difference of actual less standard hours for actual production in the month.	Third Variance (C+D)	Second Variance (C)	
		D—Capacity Volume Component—Fixed component of standard burden rate times difference of "normal" hours for the month less actual hours for the month.		Third Variance (D)	Third Variance (D)

EXHIBIT 3

Analysis Plans Using Three Variances

While less common in practice than the use of two overhead variances, a few companies develop three overhead variances. Such plans are often described in cost accounting textbooks.

The use of three overhead variances isolates the effect of differences between actual and standard hours on fixed or variable costs or both. It therefore seems that a plan employing three overhead variances would be more useful than a two variance plan only where there are frequent and important differences between actual hours and standard hours and where these differences are not more conveniently controllable by other means.

The three variances are obtained by combining the previously described components in three different ways. These are described below and summarized in Exhibit 3. Figures used are taken from Exhibit 2.

Method 1: Components A and B are treated as separate variances, but components C and D are combined into a single volume variance.[4]

First variance (A)	$ 9
Second variance (B)	4
Third variance, (C plus D)	20
Total variance	$33

It seems that this method might be the most useful of the three variance plans when variable overhead costs are high in relation to fixed costs, or it is otherwise desired to focus attention on variances from variable costs.

Method 2: Components A and B are combined into a single variance while components C and D are shown as separate variances.[5]

First variance (A plus B)	$13
Second variance (C)	8
Third variance (D)	12
Total variance	$33

This method tends to focus attention on the fixed costs and would probably be preferable to method 1 when fixed overhead costs are high relative to variable overhead costs.

Method 3: Components B and C are combined into one variance while components A and D are reported as separate variances.[6]

First variance (A)	$ 9
Second variance (B plus C)	12
Third variance (D)	12
	$33

These variances might constitute a useful analysis when the plant operates steadily at a volume close enough to standard capacity so fixed and variable costs of the excess hours may reasonably be combined to show a total cost for excess hours, i.e., when the fixed costs corresponding to the excess hours could have been used for extra production instead of being lost as idle capacity.

[4]Described by J. H. March, "Cost Accounting," published by McGraw-Hill Book Company, 1949.

[5]Described by Uniform Accounting Manual for Electrical Manufacturing Industry, 1950.

[6]Described by C. F. Schlatter, "Cost Accounting," published by John Wiley & Sons, Inc., 1947.

THE COST FORUM

BETTER ACCOUNTING SERVICE THROUGH DESKILLING ROUTINES AND SPECIALIZING ANALYSIS

Editor, N.A.C.A. Bulletin:

THE ACCOUNTANT must give serious consideration to the organization of his force, as the quality of his assistance to others is largely dependent upon how his own department is organized and how it functions. We must constantly keep in the forefront of our thinking the fact that the effectiveness and efficiency of analytical work is retarded to the degree that routine functions encroach on our time. Analysis, interpretation and presentation of accounting information is not the type of work which lends itself to a time schedule. A complete analysis usually requires an indefinite amount of time. The press of routine functions which cannot be deferred detracts from consistently high quality and thoroughness of the analytical activity.

Much progress has been made by accountants in the acceptance of new and improved systems. There is no doubt that many accounting organizations have been improved by training programs which emphasize analytical skills. Also, there have been many simplified and mechanical methods adopted which have increased efficiency and expedited complex modern accounting. These adaptations have, in most cases, been accepted to reduce direct accounting costs or to allow accountants more time for analyses and interpretation of operating results. However, the question arises, whether or not the maximum benefits from these improvements have been realized. The objective of providing time for analysis of operating results is an excellent one but the responsibility for analysis must be delegated properly. For this reason, the primary objective of improved accounting analytical service seems to first warrant an analysis of the organization which is to provide the service.

The key to the most effective analytical activity is specialization. The responsibility for final analysis, interpretation and method of presentation of accounting data must be invested in a selected group of employees who have been relieved of all routine assignments. This calls for a reassignment of duties and a reorganization of accounting forces. Some companies have attained results through the use of the following basic modernization plan.

1. Deskill Routine Functions
   a. Through method improvements.
   b. Through use of most modern accounting mechanical equipment.
   c. Through use of electronics.
2. Specialize in Analysis and Presentation of Facts.
   a. Carefully select key personnel as analysts.
   b. Provide adequate training in analytical functions and modern methods of presentation of facts.
   c. Relieve analysts of routine assignments.
3. Plan and Install a Definite and Intensive Analytical Program for Profit Improvement.
   a. Delegate responsibility for the program.
   b. Follow-up the results.

The degree to which this plan of reorganization can be adopted is, of course, governed by the size of the enterprise and accounting force. However, where it has been practicable to apply it, it has been found that deskilling of routine functions provides savings in time and manpower

which can be shifted to analytical functions. This permits attainment of the objective with no increase in accounting costs and provides profit improvement potentials.

The successful solution of present-day complex accounting and management problems demands exceptional skill. This applies particularly to the top strata of an accounting organization if it is to increase its development and participation in management decisions. The pressure upon other branches of management, brought about by government regulations, problems in industrial and public relations, etc., leaves but scarce time to devote to the main job of directing the organization toward the goal of increased profit. Here is where the accountant must step in with the analysis which present the facts requiring corrective action by management.

GEO. W. WACHTER, *Birmingham Chapter*

AN EMPLOYEE SUGGESTION PLAN FOR THE ACCOUNTING DEPARTMENT

Editor, N.A.C.A. Bulletin:

THE MAJOR OBJECTIVE of a modern accounting organization is to provide management with service which will assist in effecting cost reduction and profit improvement. Very often, the enthusiasm and demand to furnish more and more information results in an oversight or disregard of a very important factor. This factor is the cost of such accounting service in relationship to the benefits received. The accountant's activity in providing source material for profit improvement behooves him to keep his own house in order. Therefore, appraisal of accounting functions becomes of prime importance towards rendering management service at the lowest possible cost.

This letter outlines a plan through which the thinking of employees within an accounting organization may be utilized very effectively in reducing accounting costs. The key thought which formed the foundation for this plan was the realization that too often supervisors and employees at lower levels acquire the feeling that current accounting procedure constitutes an inviolate rule laid down by management, which must be followed without question. Means to dispel this feeling and to encourage suggestions for improvement in accounting methods and procedures formed the basis for the adoption of a new suggestion plan.

Every business concern is susceptible to a gradual accumulation of inefficiencies and superfluous work in its accounting activities. These adverse factors may be the result of an established precedent or the whim of some individual. A change in conditions, going unnoticed, may render records valueless without effecting their elimination. This is particularly true in a large concern where reports may be overlapping, obsolete, prepared too frequently or distributed too widely. In these cases a good "house-cleaning" is necessary to "get down to bed rock." But, to contribute effectively, employees must feel confidence that improvements are wanted.

The principal feature of our plan was to encourage accounting employees to question the value of each report, procedure and function. This objective was discussed with all key accounting employees who, in turn, held meetings with their associates. The plan shaped up as follows:

1. Supervisors at all levels encourage suggestions for cost reduction in accounting functions.
2. A top level accounting supervisor is designated to make final appraisal of all major suggestions.
3. An employee must submit his suggestion in writing to his immediate supervisor. The immediate supervisor acknowledges receipt of the suggestion and appends his comments. It is then routed along organizational lines to the designated

top supervisor, with comments from all intermediate supervisors.

4. The accounting executive heading up the program arranges for a careful review and investigation of suggestions. At this point, a record of all suggestions is maintained, showing description, by whom submitted, action taken and savings realized.
5. The chief accounting officer or his designee writes a personal letter to each employee who has submitted an idea. This letter commends him for the suggestion and advises him what action will be taken. Such letters are routed through the immediate supervisor for review and delivery to the employee. A copy of this letter is also placed in the employee's history file.
6. Employees submitting suggestions which result in substantial "out-of-pocket" savings receive awards in relationship to the value of the suggestion.

Where similar operations are carried on at more than one location, full advantage is taken of the suggestions made for one location which are applicable to others.

Obviously, a program of this kind must be diligently pursued and some form of stimulation injected at least every two weeks to keep it alive. Periodic meetings of supervisory personnel are scheduled for the purpose of reviewing progress. Supervisors attending such meetings advise associates of the substance of the proceedings. The results of this program for its present short period of operation have been very gratifying. A large measure of the success is attributed to the enthusiasm engendered by placing emphasis on individual employee recognition and commendation.

Many practical suggestions for improving accounting functions and decreasing costs have been received. Some of these will result in reduction in personnel needed for particular work. Others will result in a reduction of only a comparatively small number of manhours in accounting efforts. The latter will not directly reduce accounting costs in the absolute but will allow more time for worthwhile effort. In the long run it is expected that the program will add substantially to the attainment of the objective of most efficient accounting service at a minimum cost.

J. L. BROWNLEE, *Birmingham Chapter*

ENGINEERING AND SHOP INFORMATION WHICH THE COST ACCOUNTANT SHOULD HAVE AT HAND

Editor, N.A.C.A. Bulletin:

THERE ARE A SURPRISING NUMBER of small and medium-sized companies operating successfully using only the most elementary of cost and production control techniques. But the day arrives, for many of these concerns, when volume increases to the point at which management recognizes a need for cost standards and for the mechanization of cost and production control procedures. The consultant, or new cost chief, appearing on the scene, all to often finds that the basic engineering and control information, necessary to install a useful standard cost system or to successfully employ tabulating equipment, is largely lacking. He is compelled to report that it may take many years before management can have the type of control it finds it so sorely needs. It is a time-consuming, costly, and discouraging project at this stage of the game to compile, revise, undo and re-do reams of records. Management often balks.

There is no easy solution to the problem of developing the type of information which is necessary for standards in the form suitable for mechanization. However, while a company is still small or growth has just begun, procedures can be revised and absorbed more easily and data can thereafter be collected on a current basis. Since most of the foundations for cost control are of an engineering nature, and the engineering department is a separate entity, the accountant often hesitates to use

his influence in guiding the development of engineering and production procedures with an eye towards the future need of cost control. The following are some of the records which most often seem to be of minor importance to engineering and production personnel of small companies, but which may be essential to the accountant in the future:

1. **Stock classification of purchased materials**—It is never too early to compile a stock catalogue. Both ease of control and mechanization are dependent on every item having a number.
2. **Complete detail drawings** — Similarly every manufactured part must have a name and number. Experienced production personnel may be capable of operating satisfactorily from sales sketches or memory, but adequate cost and production control must be operated on organized data files.
3. **Cross-reference file of drawing numbers and part names**—This is a big job if you start late, but it is a valuable tool in deciding what is special and what is standard. Furthermore, special items often become standard. Since mechanization depends on numerical identification, we may become lost if we cannot quickly refer from part name to part number and vice versa.
4. **Complete material lists**—Original engineering material lists should be in as complete detail as practicable, including even the most significant direct items. All of this information may not be useful at present, but, with standards and mechanization, it can all be put to use in procurement planning and accurate costing.
5. **Standard sub-assemblies**—Manufacturers whose products consist of interchangeable parts must definitely determine at what stage of completion subassemblies are to be stocked. Each subassembly must have a name, number, drawing, and material list.
6. **Established plant routing for all products** —Costs are of little value if the same item is not consistently routed through the plant in the same manner. The best way to assure consistency is to put routings in writing and use them on work orders.
7. **Information by product**—Smaller organizations frequently collect cost data by customer order. Although this may be a convenient practice for order costing, it is of little value for product costing, cost control or scheduling.

If the above information is not available or is not kept on a current basis, the road to standard costs and mechanized cost control is sure to be long and rocky.

DAVID I. TUCKER, *Pittsburgh Chapter*

PUT "DELEGATION" AND "UNDERSTUDY" INTO THE COST ACCOUNTING VOCABULARY

Editor, N.A.C.A. Bulletin:

ONE OF THE MORE PREVALENT REASONS underlying lack of time by the cost accounting supervisor to do things that he never seems to have time to do is that he usually attains his position by working up through the ranks and, in his effort and zeal to progress, wants to do everything himself.

One of the more prevalent reasons underlying lack of time by the cost accounting supervisor to do things that he never seems to have time to do is that he usually attains his position by working up through the ranks and, in his effort and zeal to progress, wants to do everything himself.

In the beginning, it was necessary for the supervisor to perform detail work, due to the very nature of the work in the cost accounting field which requires a great amount of detail. He has never broken away from this habit. He still performs detailed tasks which could easily be done by an assistant and probably much faster because of the fact that the individual to whom it would be assigned, is more familiar with the details and location of the records required, which he is constantly using. Naturally, delegation of these duties would require supervision, explanation of what is wanted, and follow-up, but the time consumed in accomplishing a task would be lessened to a great degree.

It all boils down to the supervisor's fail-

ure to properly organize and delegate phases of his duties and responsibilities. Moreover, all too frequently, the supervisor does not spend the time he should to train an understudy and thereby loses all the benefits such a trained understudy would provide. How many cost accountants forego a vacation because they "just can't get away?" How many have taken their vacation "a day at a time," defeating the purposes of vacations. One way to have time to take and enjoy a vacation, and on the job, to have time to devote to human relations, methods revisions, etc., is to effectively delegate detail tasks and to train an understudy thoroughly.

Some of the advantages of training an understudy and of effective delegation are:

1. **Provides more time for supervision of personnel**—Allows the cost accountant to cover more area because his understudy is covering areas where the supervisor cannot be. Provides the former with more time in which he can exercise his training in human relations.
2. **Provides replacements in case of promotion**—Better and higher positions have often been available which the cost accountant could capably fill except for the fact that, upon investigation, it was found there was no one to take his place. In order not to create a bottleneck, someone else was selected for the promotion. This has happened more often than we realize.
3. **Provides the cost accountant with someone with whom he can discuss problems**—Two heads are definitely better than one. If we can sit down and talk over a problem with someone, new and brighter ideas and better solutions to the problem are uncovered. The thoughts and ideas of another individual interested in a problem can help considerably in its solution.
4. **Provides relief from many detailed tasks and minor matters**—By delegating to an understudy this type of work which, in itself, is time-consuming but necessary, the cost accountant makes available more time to devote to his main duties.
5. **Provides an efficiently and effectively functioning department during the absence of the cost accountant**—During vacations or illness, an understudy can assume the responsibilities of the cost accountant so that no bottlenecks are created.
6. **Provides for the development of individuals to assume higher positions and more responsibilities**—This advantage accrues particularly to the organization as a whole. A group of understudies, who are well-trained, provide the organization with a reservoir from which responsible positions can be filled when openings occur. This knowledge, in the minds of all individuals within the organization, should instill in them the desire to do their best to enable themselves to progress within the organization.
7. **Provides the cost accountant with more time for improving the efficiency of his department, bettering methods, revising reports, etc.**—One of the more important duties of the cost accountant is in providing top management with reports as quickly as possible and in such form that they can readily be interpreted and understood. Careful, precise, and complete presentation of reports can mean the difference between whether a profit is made or a loss incurred. A simple shortcut in the method of preparing a report, making it available for top management's use at an earlier date than usual, might result in a decision being made in timely fashion which, if made later would result in a higher profit. It takes careful thought, and planning to do these things. Therefore, if the cost accountant has an understudy to take care of the details, he would be able to have more time to plan, study, and analyze his reports and presentations and to more effectively and efficiently carry out all his responsibilities.

Outlined above are a few but by no means all of the advantages of having an understudy and/or properly delegating duties. If more of us would assign the tasks and duties which could be ably performed by an understudy, I am sure that the number of "four ulcer" men in the cost accounting field would decrease, and the number of "triple threats" forming part of the management backfield, would increase.

G. H. GREGORY,
Norwich Chapter